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Zellner

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(54) **METHODS, SYSTEMS, AND PRODUCTS FOR PROCESSING RESPONSES IN PROMPTING SYSTEMS**

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H04M 11/00 (2006.01)

(52) **U.S. Cl.** **379/100.15**; 379/265.09

(58) **Field of Classification Search** 379/88.01–88.25, 379/52, 114.13, 100.13–100.15, 265.09; 709/206–207
See application file for complete search history.

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(57) **ABSTRACT**

Methods, systems, and products are disclosed for processing responses in a prompting system. A response is received to a prompt and compared to a set of conditions for interpreting the response. If the response is not interpretable, then an alternative presentation of the prompt is obtained. A supplemental prompt is sent that presents the alternative presentation of the prompt.

17 Claims, 16 Drawing Sheets

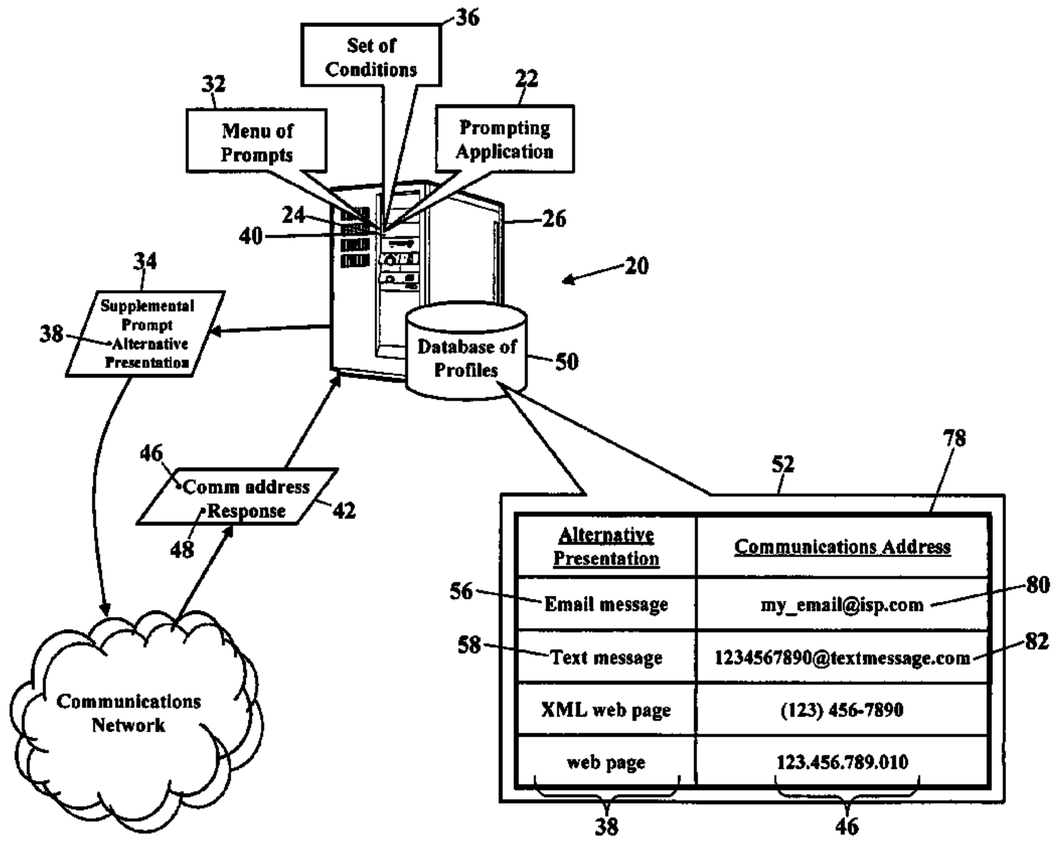

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FIG. 1

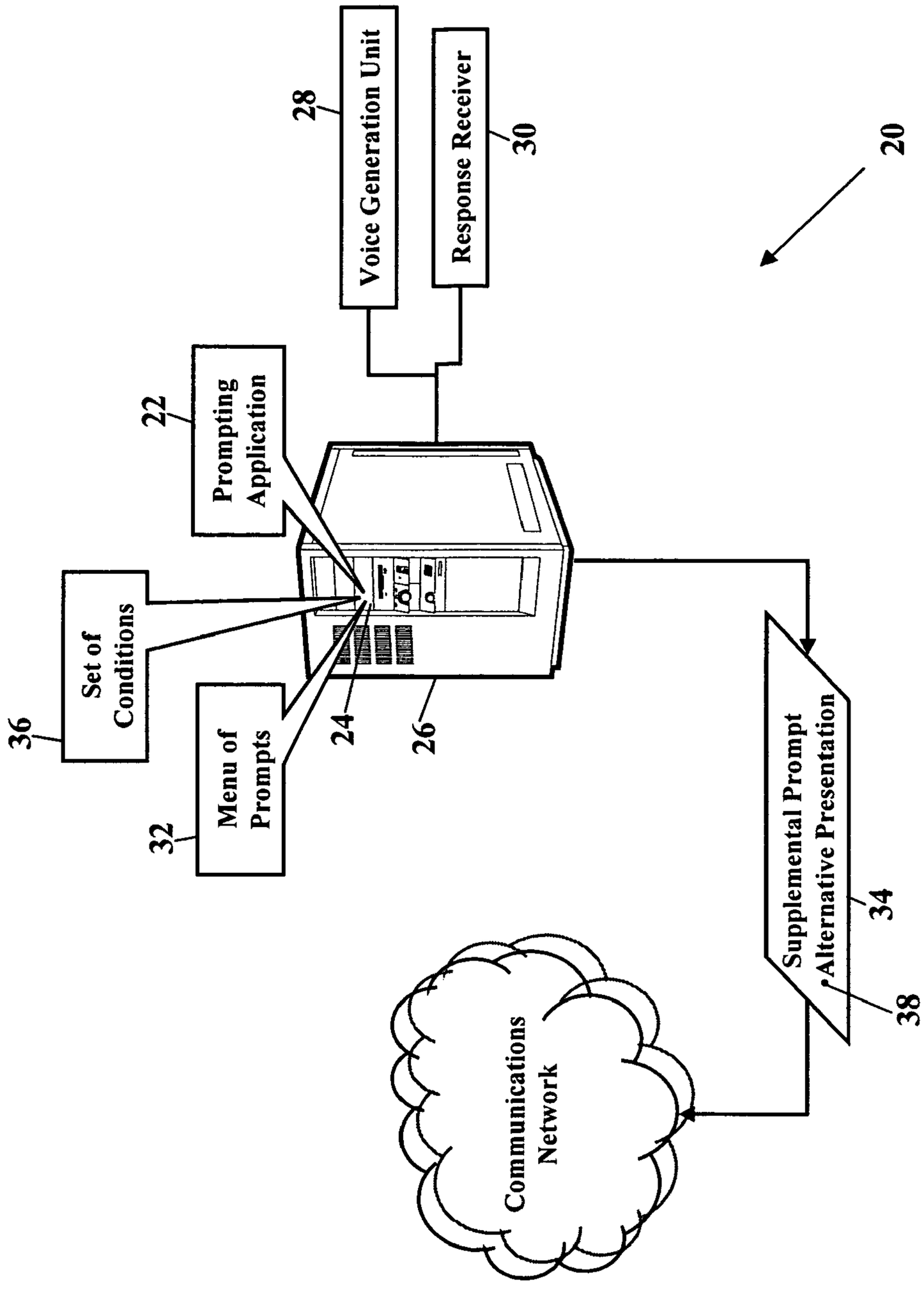

20
28
Voice Generation Unit
30
Response Receiver
22
Prompting Application
36
Set of Conditions
32
Menu of Prompts
24
26
Communications Network
Supplemental Prompt
Alternative Presentation
34
38

FIG. 2

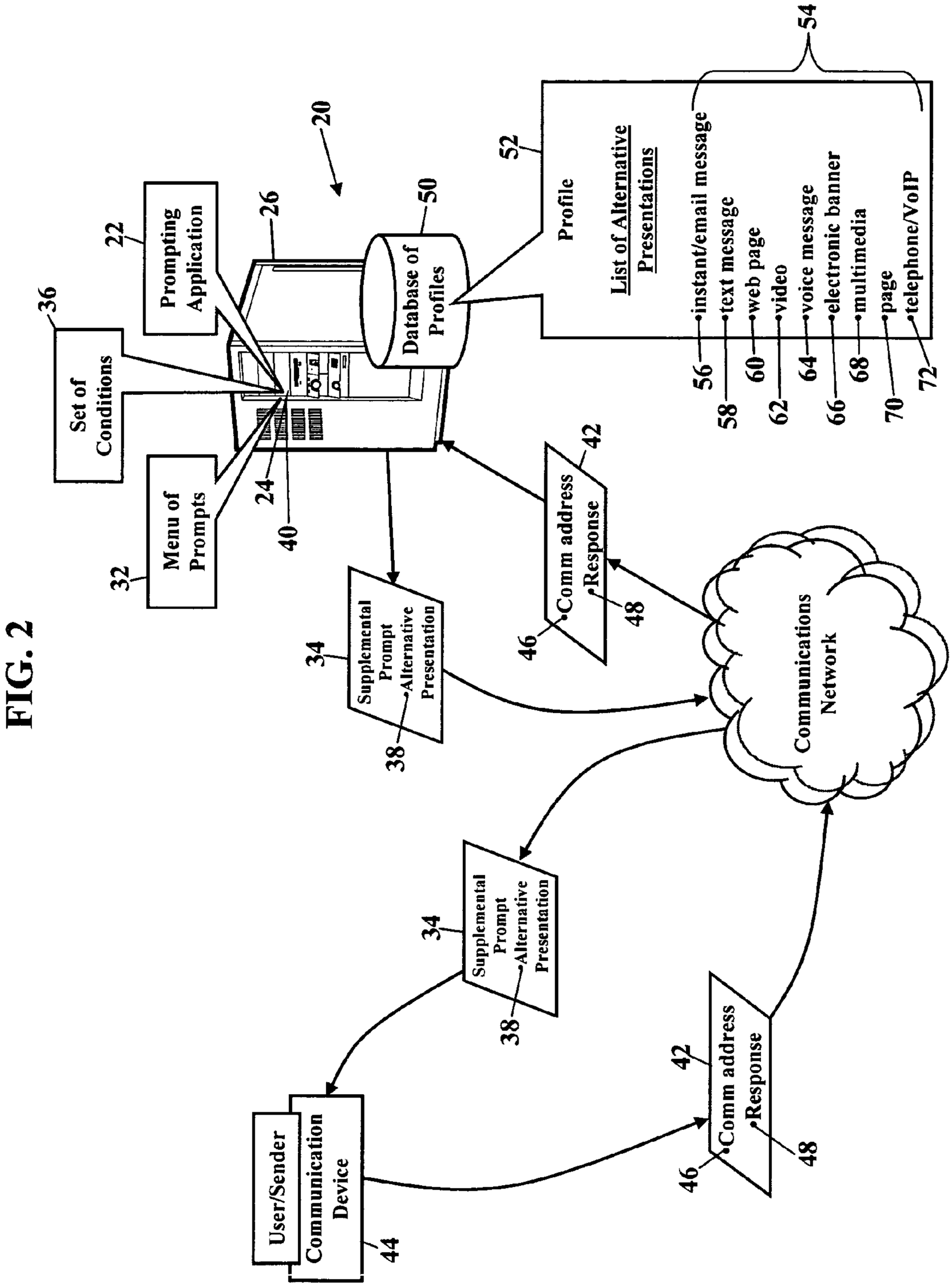

20
22
Prompting Application
26
50
Database of Profiles
52
Profile
List of Alternative Presentations
54
instant/email message
text message
web page
video
voice message
electronic banner
multimedia
page
telephone/VoIP
56
58
60
62
64
66
68
70
72
36
Set of Conditions
32
Menu of Prompts
24
40
34
Supplemental Prompt Alternative Presentation
38
42
Comm address Response
46
48
Communications Network
User/Sender Communication Device
44

FIG. 3

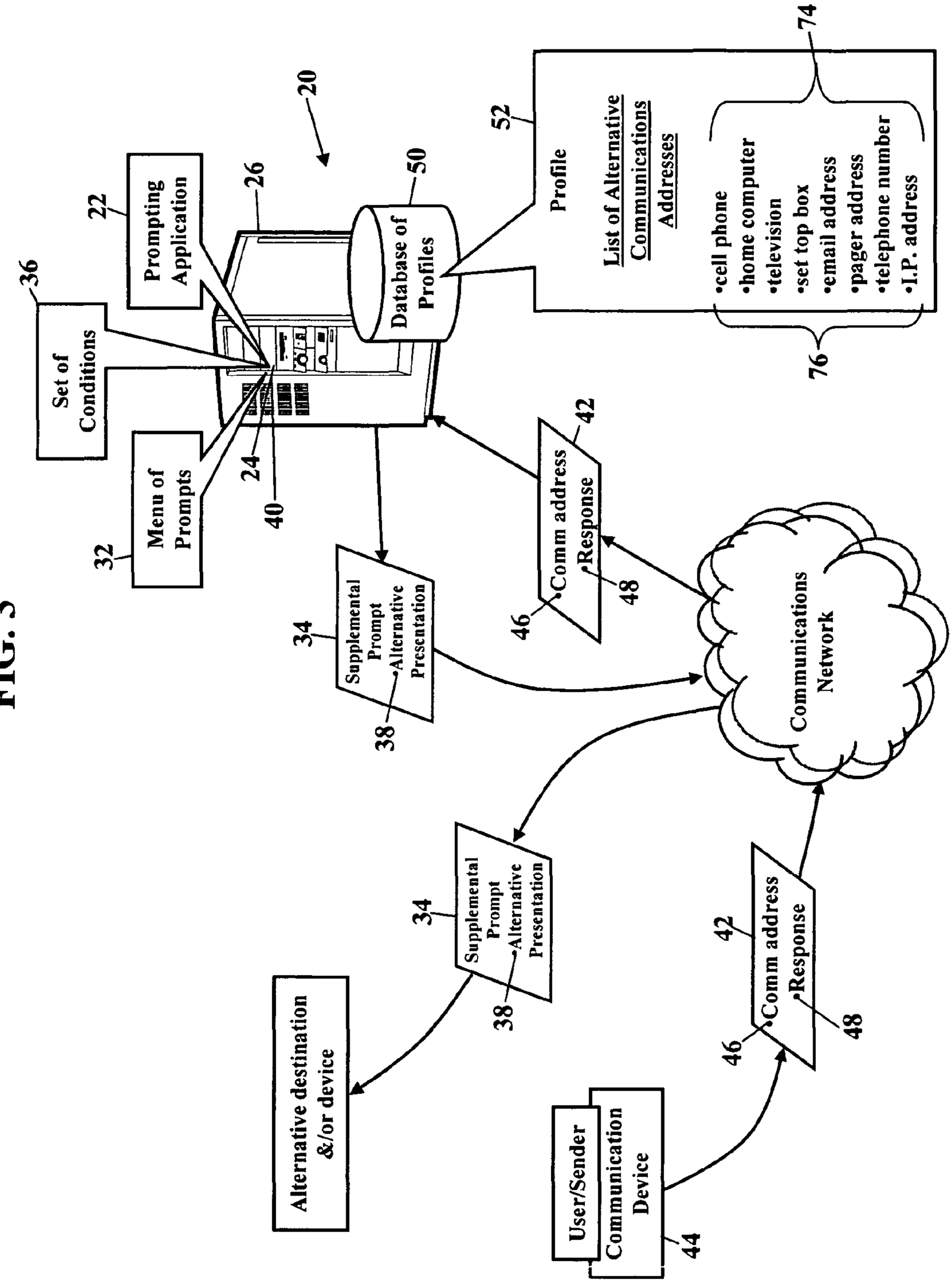

20
22
Prompting Application
26
50
Database of Profiles
52
Profile
List of Alternative Communications Addresses
•cell phone
•home computer
•television
•set top box
•email address
•pager address
•telephone number
•I.P. address
74
76
36
Set of Conditions
32
Menu of Prompts
24
40
34
Supplemental Prompt Alternative Presentation
38
42
Comm address Response
46
48
Communications Network
Alternative destination &/or device
User/Sender Communication Device
44

FIG. 4

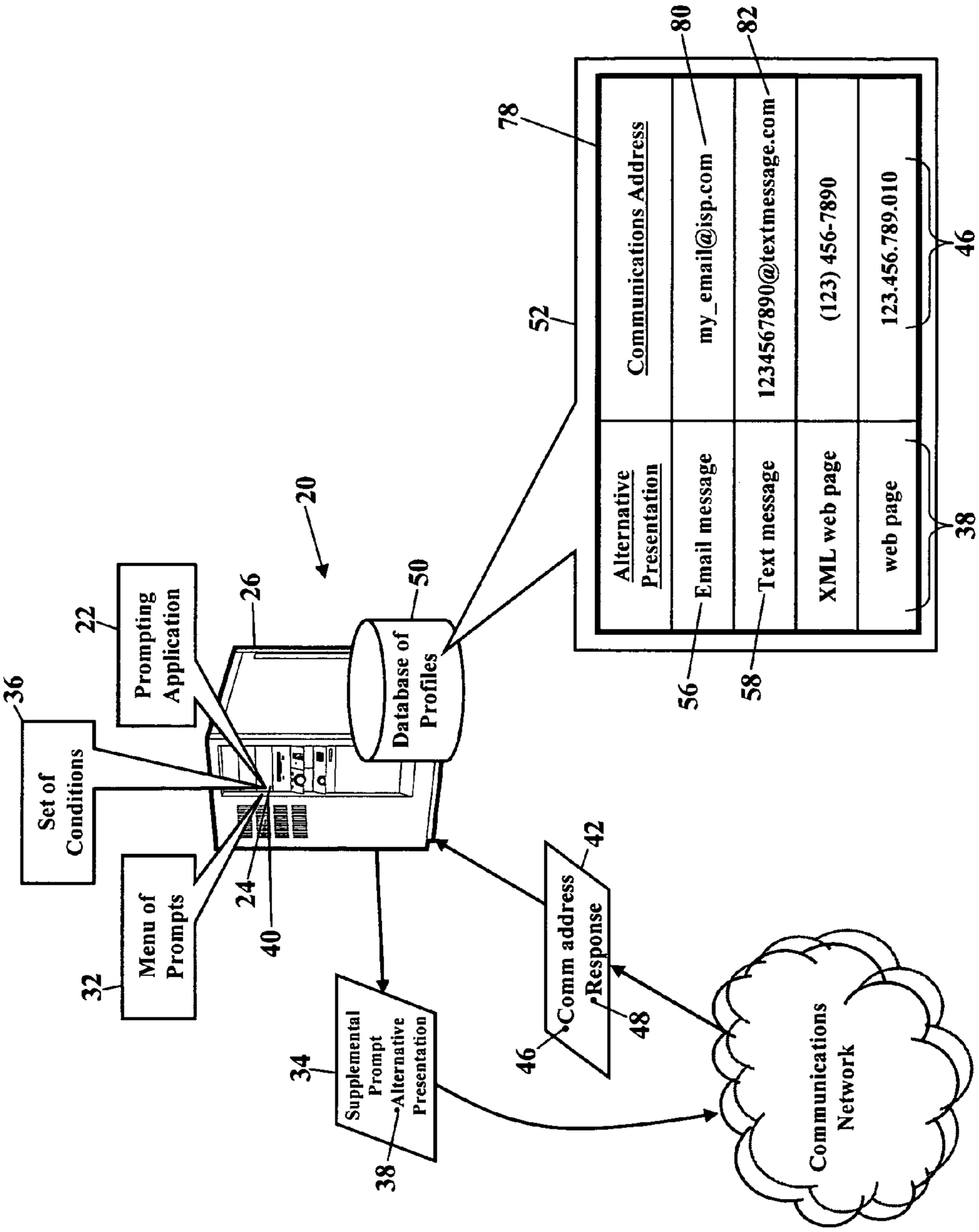

Set of Conditions
36
Prompting Application
22
Menu of Prompts
32
Database of Profiles
50
26
20
24
40
Supplemental Prompt Alternative Presentation
34
38
Comm address Response
46
48
Communications Network
42
52
78
80
82
Communications Address
Alternative Presentation
my_email@isp.com
Email message
1234567890@textmessage.com
Text message
(123) 456-7890
XML web page
123.456.789.010
web page
56
58
38
46

FIG. 5

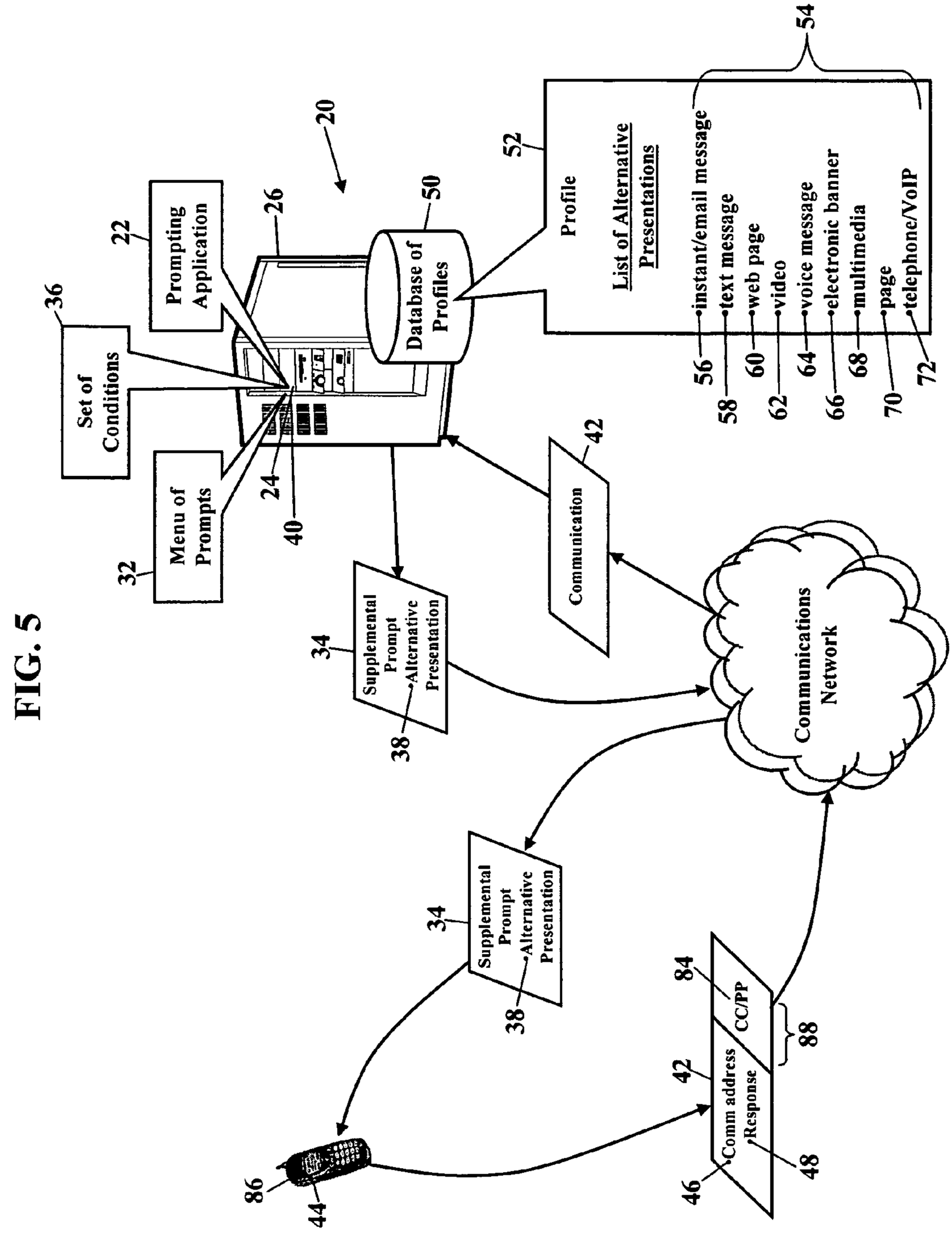

20
22
Prompting Application
26
50
Database of Profiles
52
Profile
List of Alternative Presentations
54
instant/email message
text message
web page
video
voice message
electronic banner
multimedia
page
telephone/VoIP
56
58
60
62
64
66
68
70
72
36
Set of Conditions
32
Menu of Prompts
24
40
Communication
42
34
Supplemental Prompt Alternative Presentation
38
Communications Network
34
Supplemental Prompt Alternative Presentation
38
84
CC/PP
88
42
Comm address
Response
48
46
86
44

FIG. 6

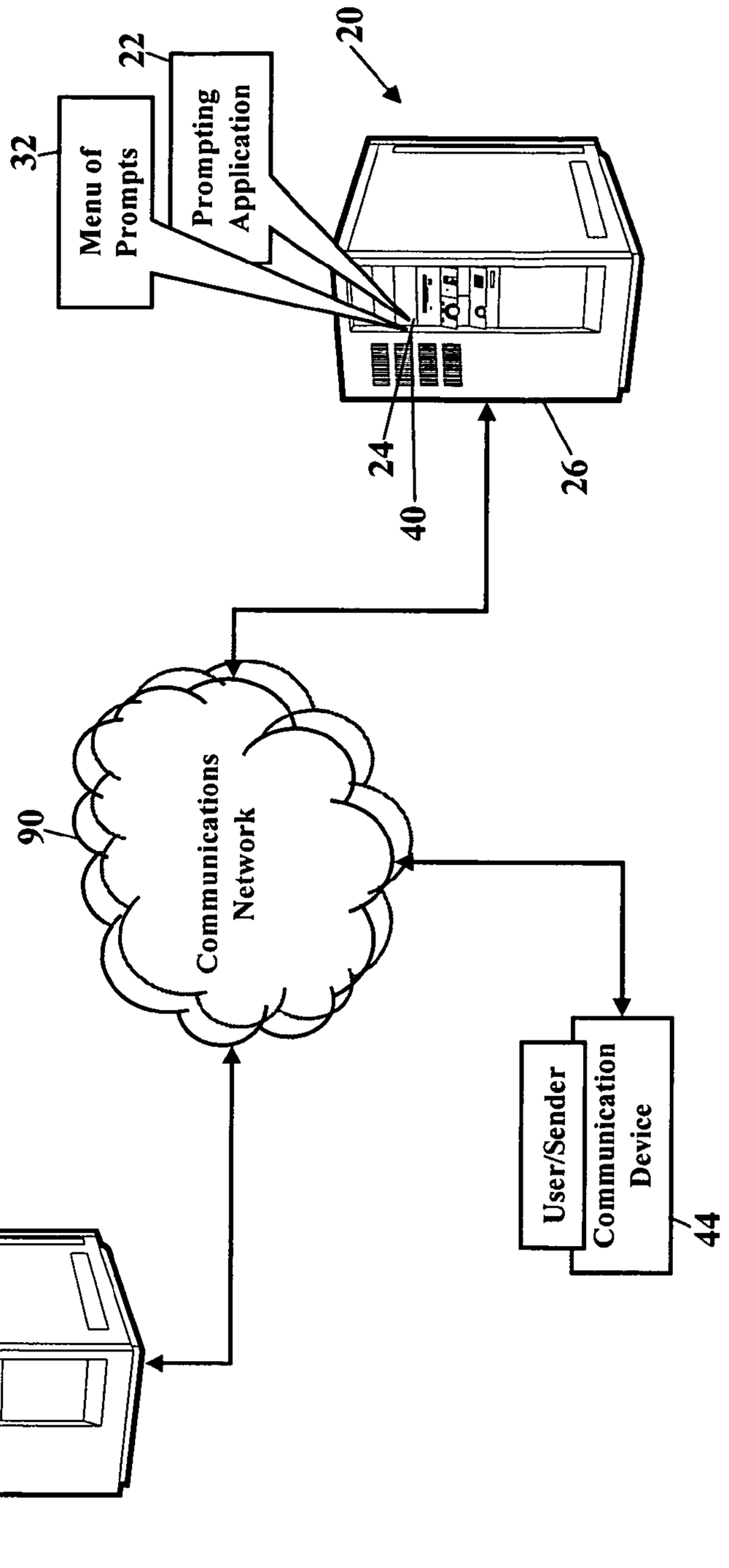

20
22
Prompting Application
32
Menu of Prompts
24
40
26
90
Communications Network
50
Database of Profiles
User/Sender Communication Device
44

FIG. 7

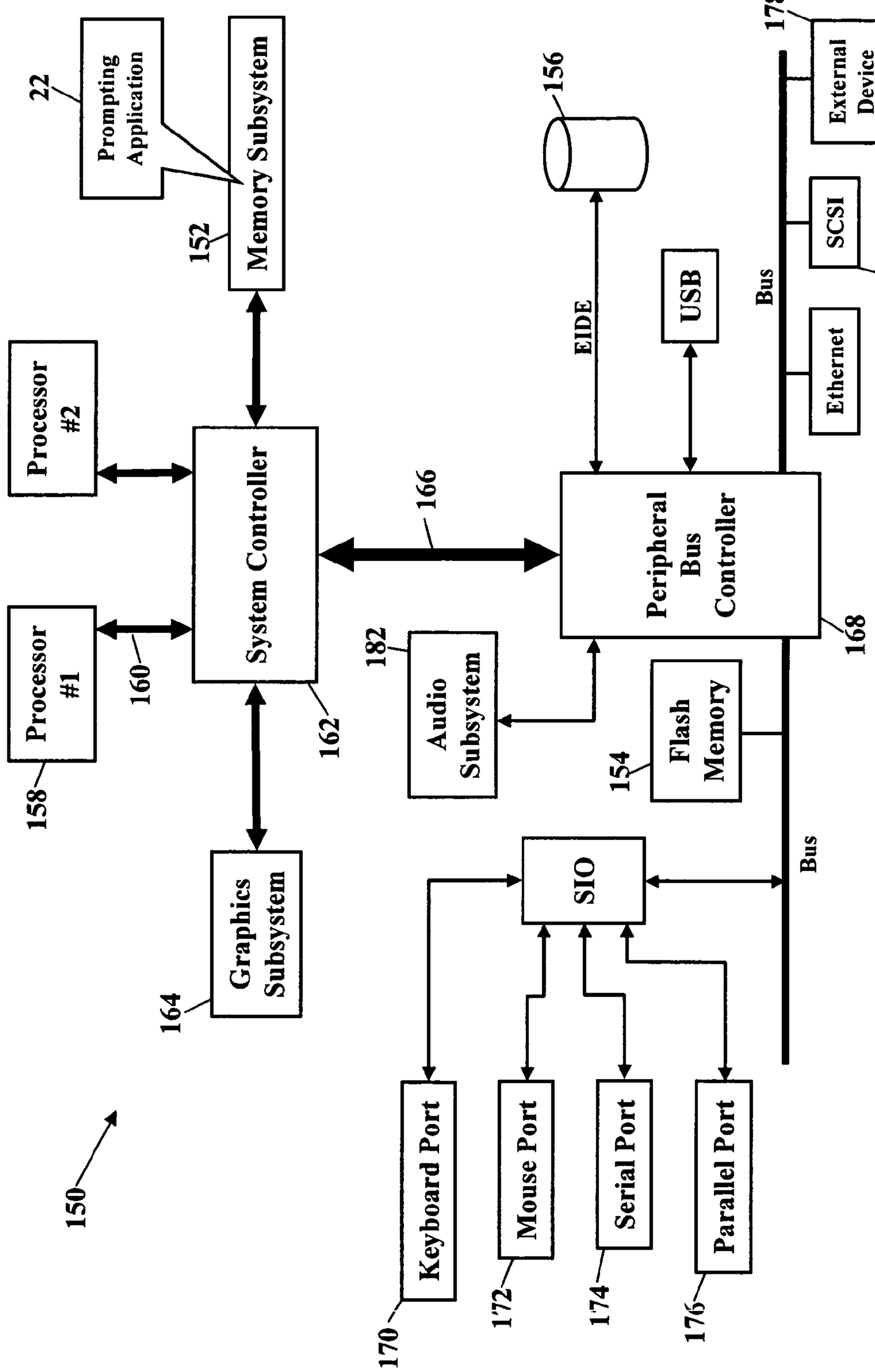

150
Processor #1
158
Processor #2
160
System Controller
162
Memory Subsystem
152
Prompting Application
22
Graphics Subsystem
164
Audio Subsystem
182
Peripheral Bus Controller
166
168
Flash Memory
154
156
EIDE
USB
Bus
178
External Device
SCSI
180
Ethernet
SIO
Keyboard Port
170
Mouse Port
172
Serial Port
174
Parallel Port
176

FIG. 8

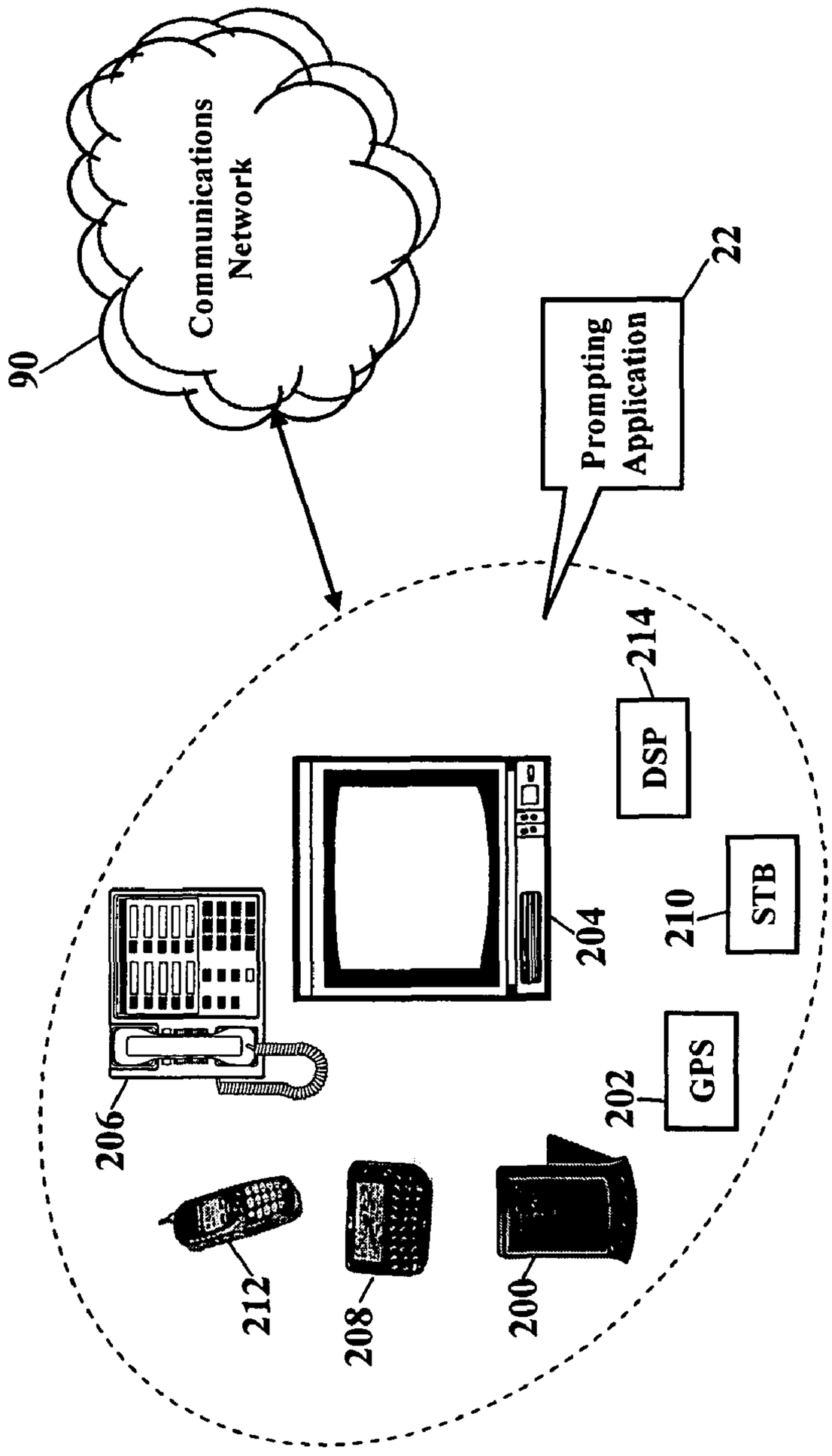

Communications Network
90
Prompting Application
22
DSP
214
STB
210
GPS
202
204
206
212
208
200

FIG. 9

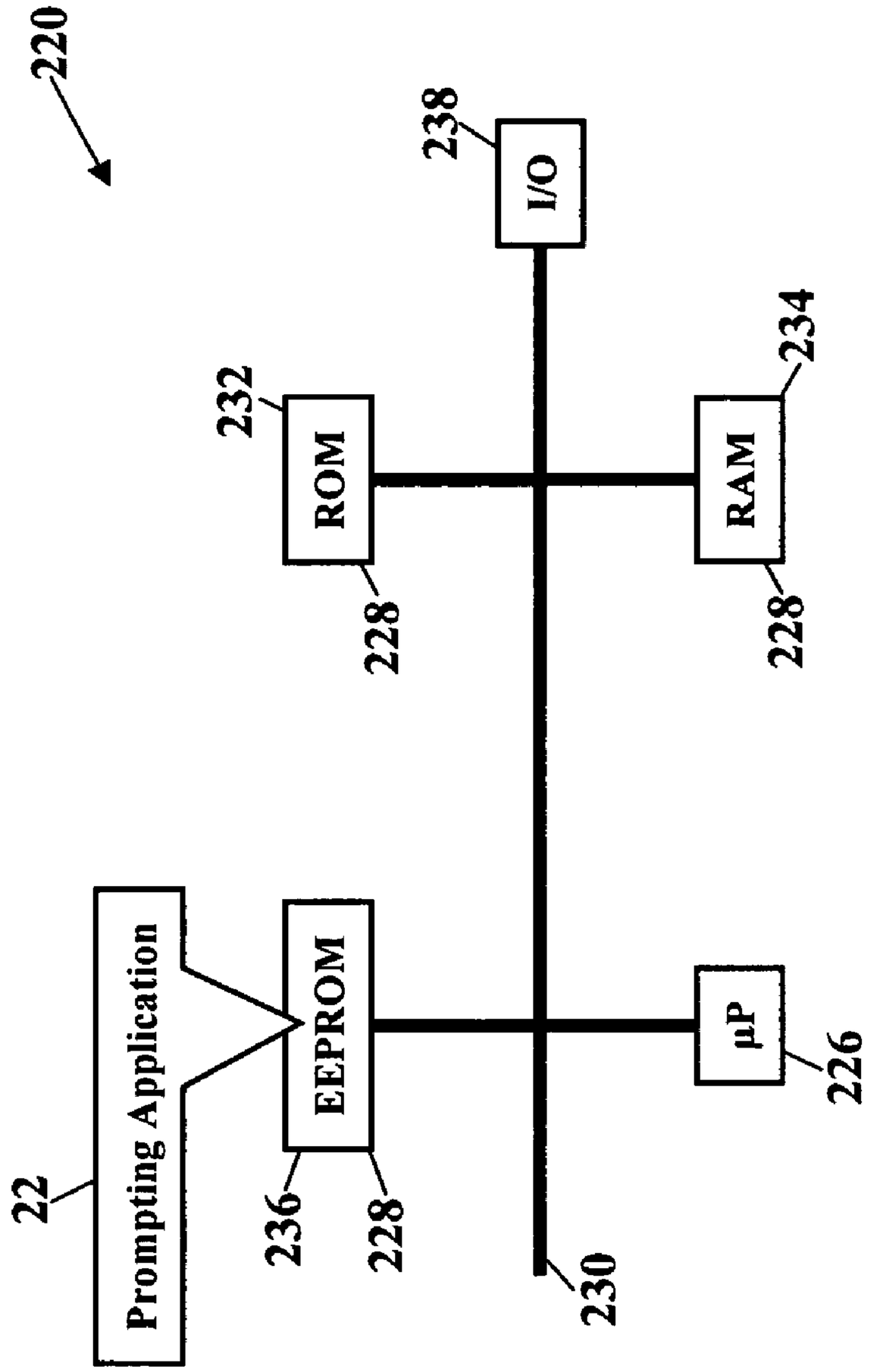

220
238
I/O
232
ROM
234
RAM
228
228
Prompting Application
EEPROM
µP
22
236
228
226
230

FIG. 10

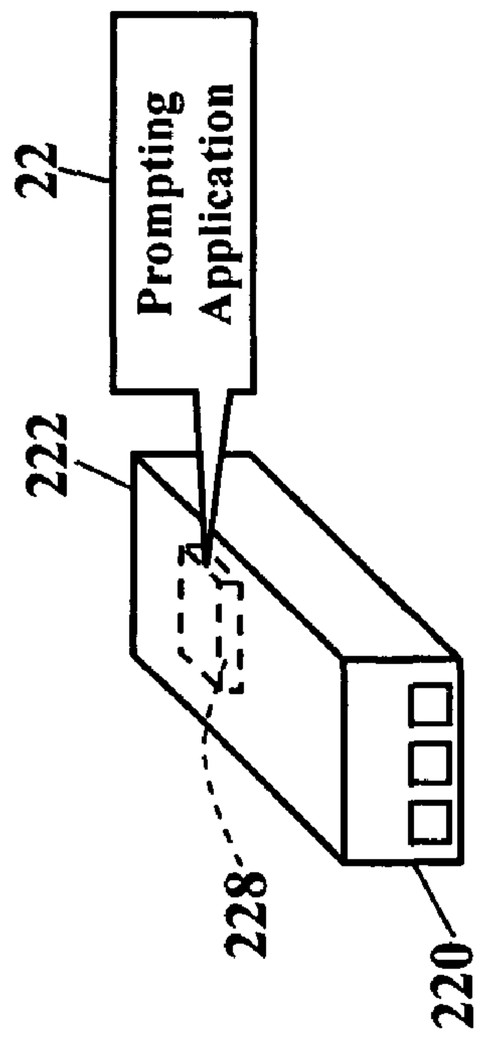

22
Prompting Application
222
228
220

FIG. 11

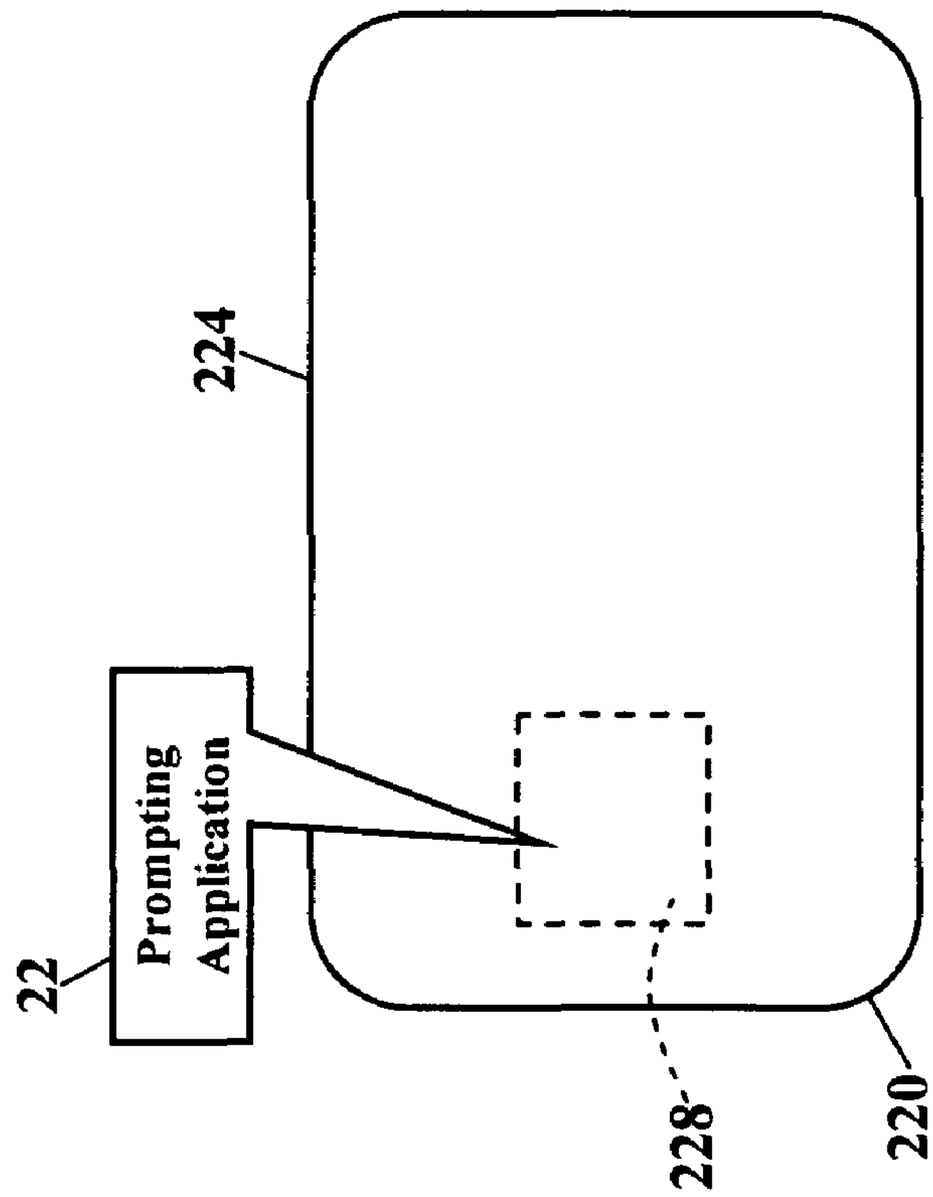

224
22
Prompting Application
228
220

FIG. 12

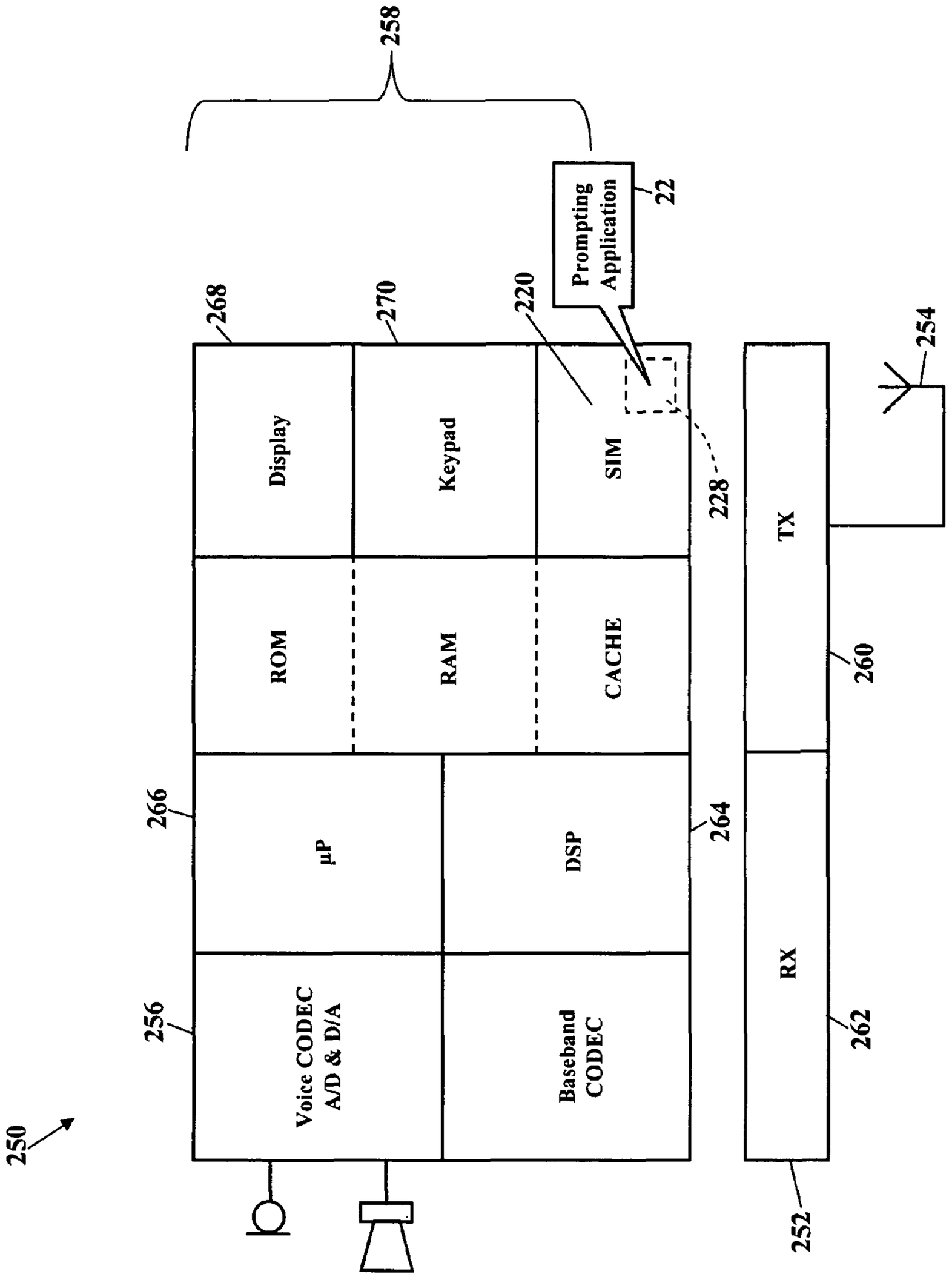

250
256
Voice CODEC A/D & D/A
266
μP
Baseband CODEC
264
DSP
ROM
RAM
CACHE
268
Display
270
Keypad
220
SIM
Prompting Application
22
228
TX
RX
254
260
262
252
258

FIG. 13

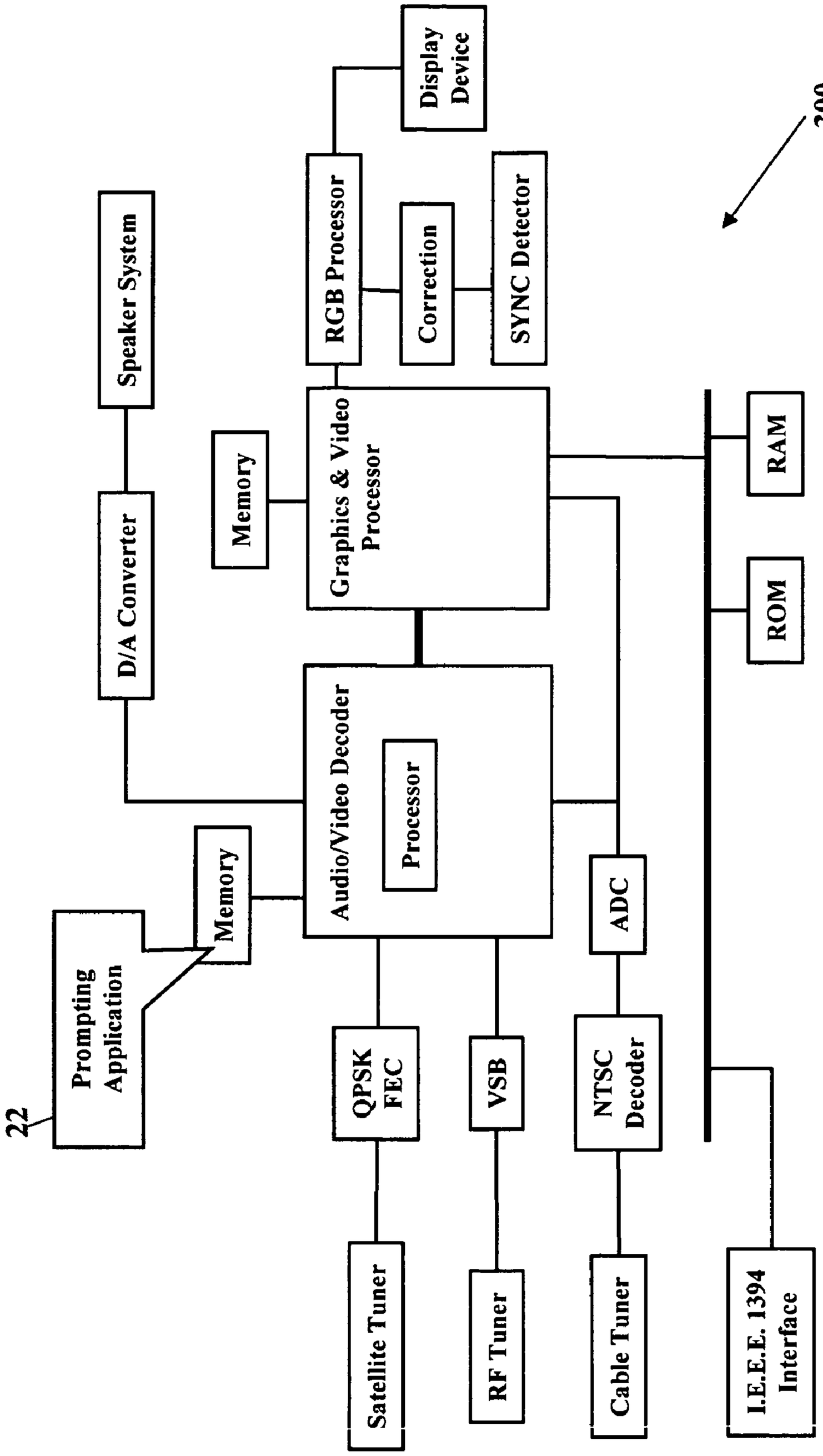

300
Display Device
RGB Processor
Correction
SYNC Detector
Speaker System
D/A Converter
Memory
Graphics & Video Processor
RAM
ROM
Audio/Video Decoder
Processor
ADC
Memory
Prompting Application
22
QPSK FEC
VSB
NTSC Decoder
Satellite Tuner
RF Tuner
Cable Tuner
I.E.E.E. 1394 Interface

FIG. 14

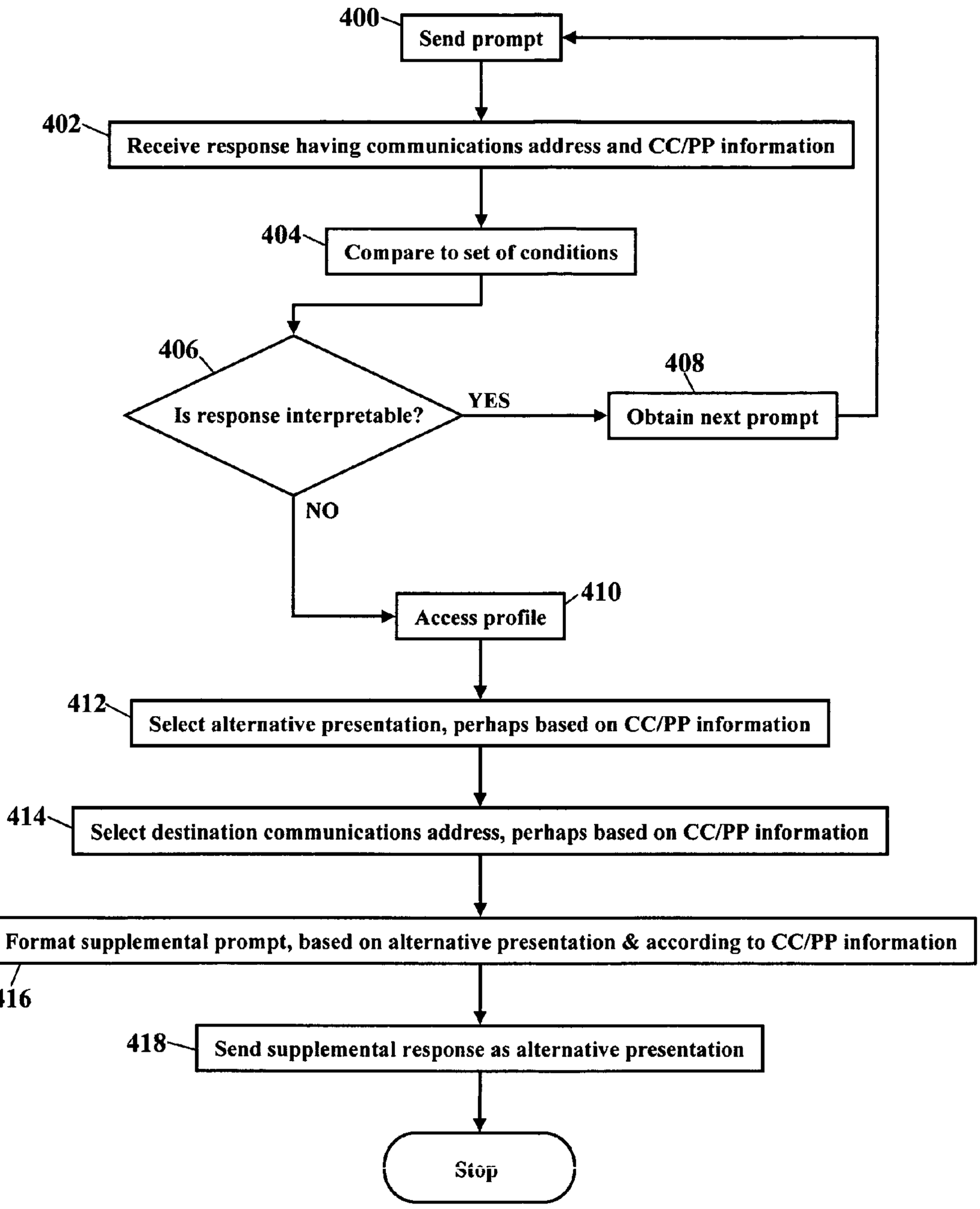

400
Send prompt
402
Receive response having communications address and CC/PP information
404
Compare to set of conditions
406
Is response interpretable?
YES
408
Obtain next prompt
NO
410
Access profile
412
Select alternative presentation, perhaps based on CC/PP information
414
Select destination communications address, perhaps based on CC/PP information
Format supplemental prompt, based on alternative presentation & according to CC/PP information
416
418
Send supplemental response as alternative presentation
Stop

FIG. 15

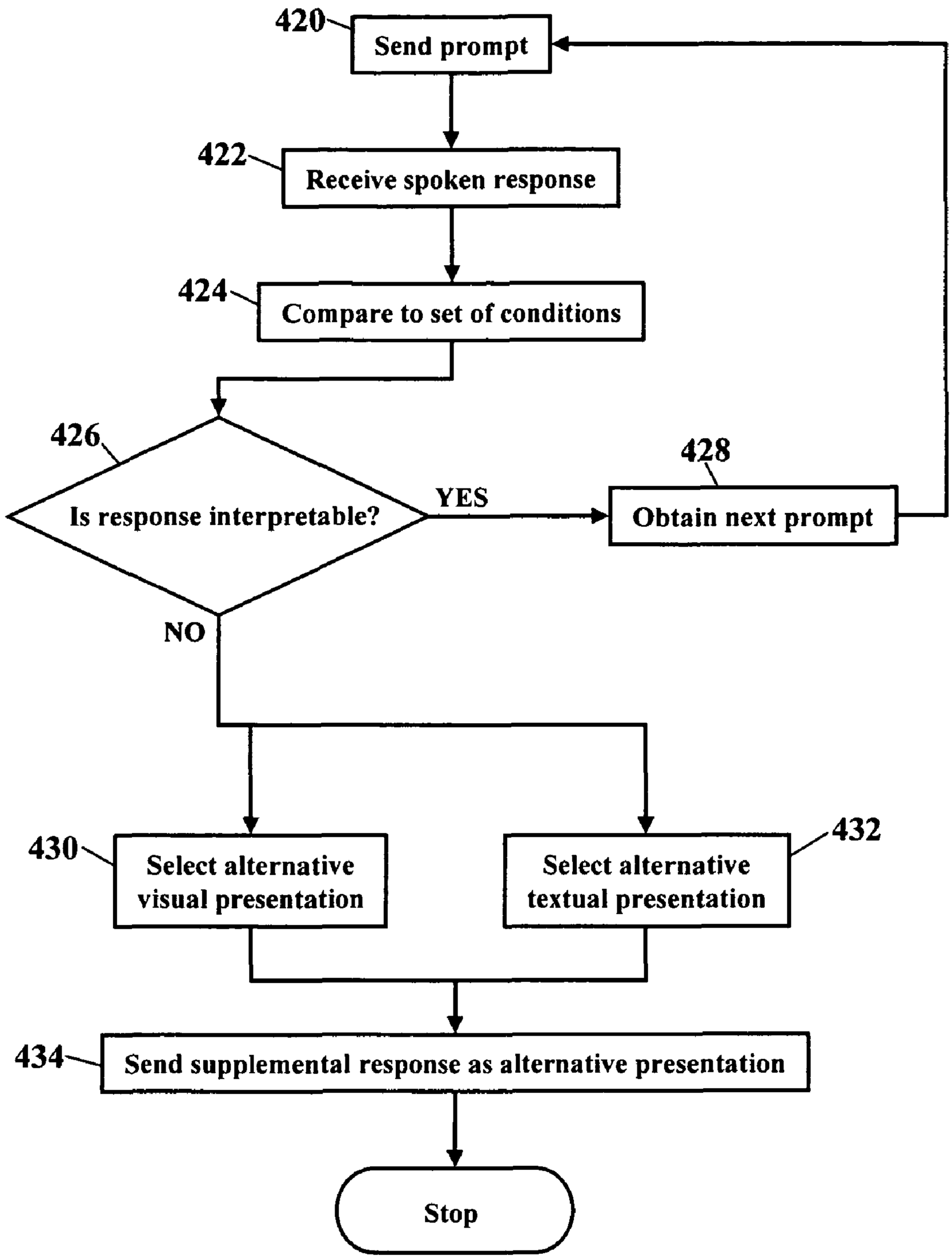

420
Send prompt
422
Receive spoken response
424
Compare to set of conditions
426
Is response interpretable?
YES
428
Obtain next prompt
NO
430
Select alternative visual presentation
Select alternative textual presentation
432
434
Send supplemental response as alternative presentation
Stop

FIG. 16

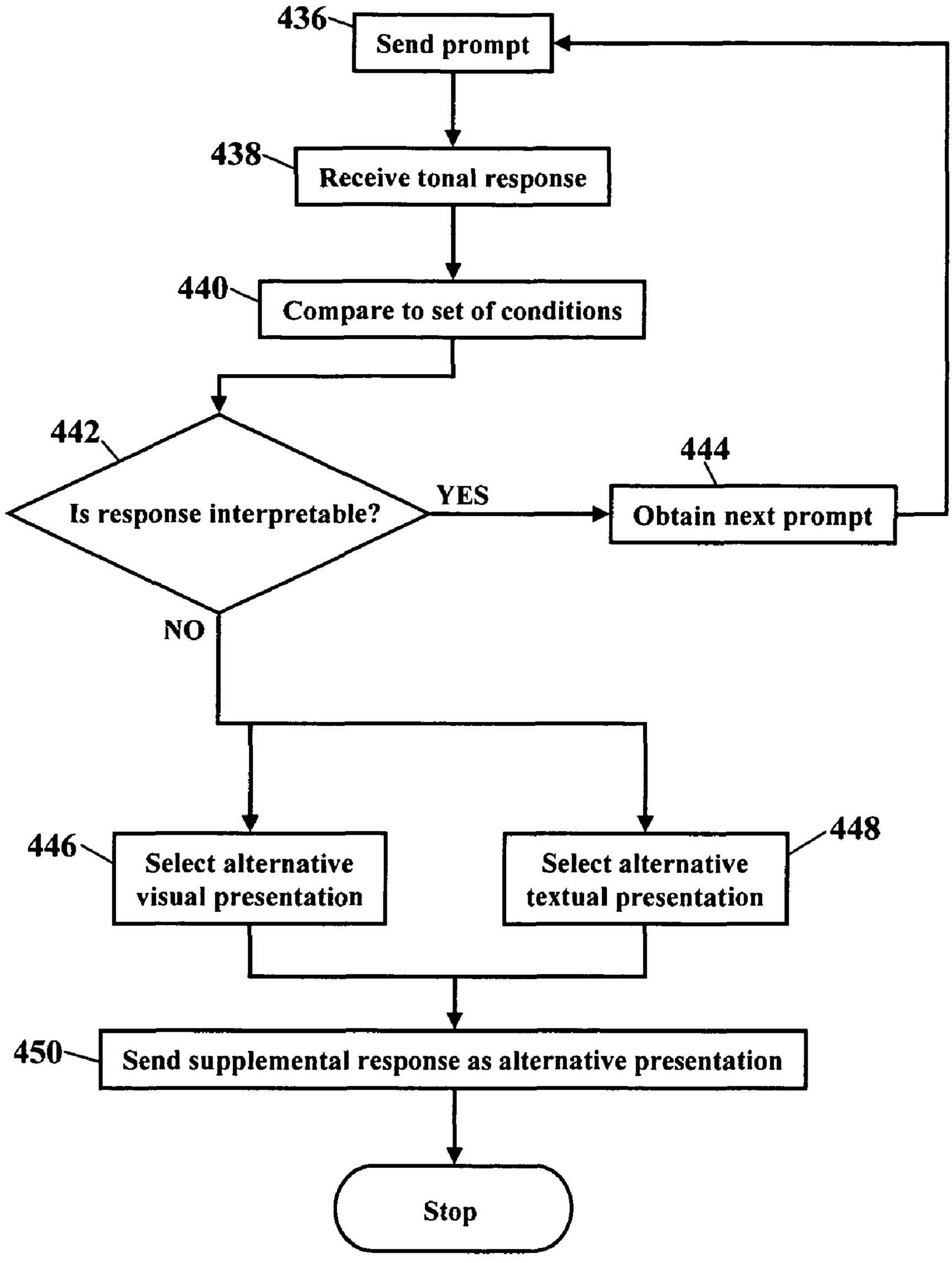
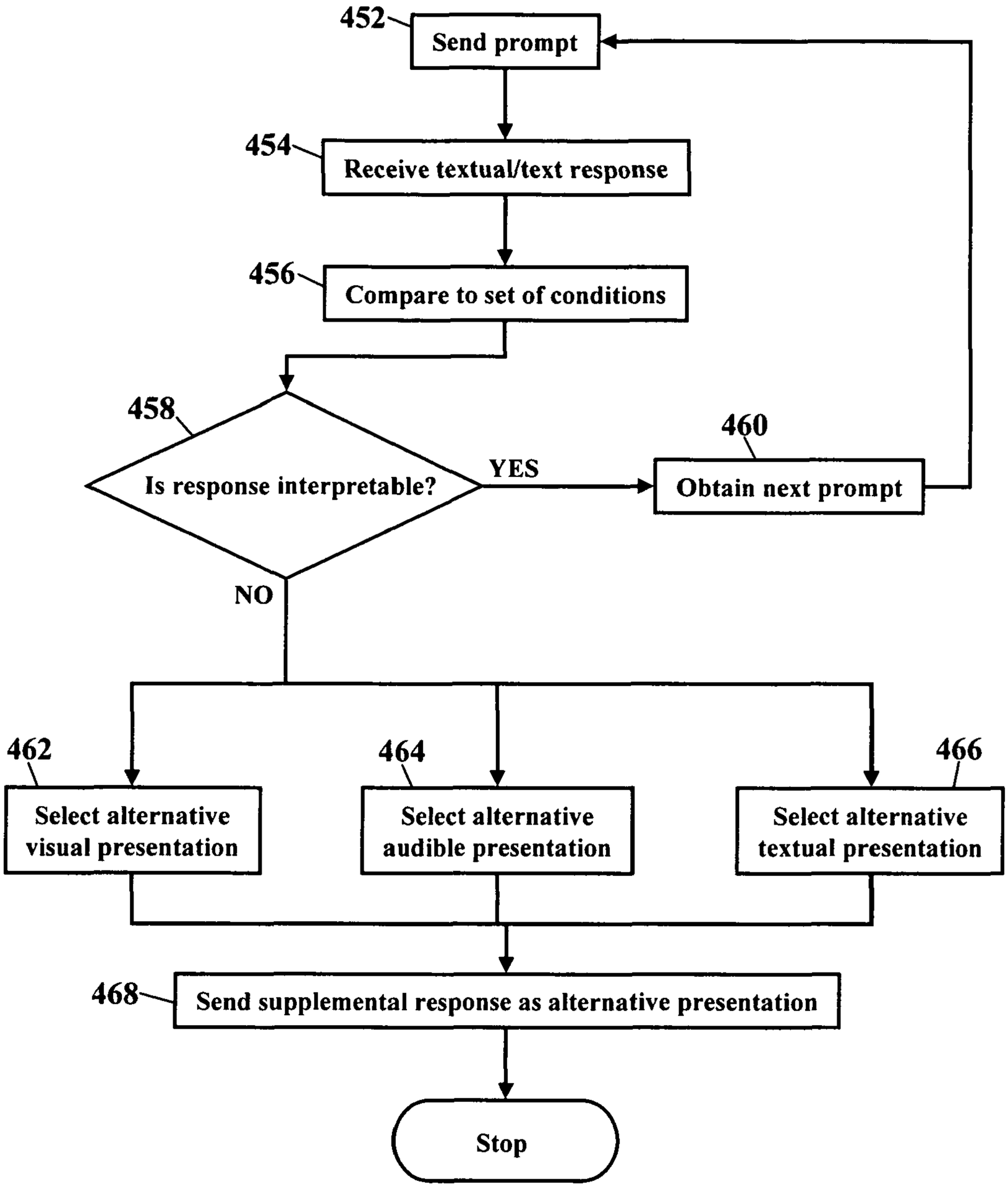

436
Send prompt
438
Receive tonal response
440
Compare to set of conditions
442
Is response interpretable?
YES
444
Obtain next prompt
NO
446
Select alternative visual presentation
448
Select alternative textual presentation
450
Send supplemental response as alternative presentation
Stop

FIG. 17


452
Send prompt
454
Receive textual/text response
456
Compare to set of conditions
458
Is response interpretable?
YES
460
Obtain next prompt
NO
462
Select alternative visual presentation
464
Select alternative audible presentation
466
Select alternative textual presentation
468
Send supplemental response as alternative presentation
Stop

METHODS, SYSTEMS, AND PRODUCTS FOR PROCESSING RESPONSES IN PROMPTING SYSTEMS

NOTICE OF COPYRIGHT PROTECTION

BACKGROUND

This application generally relates to communications and, more particularly, to prompting systems.

Prompting systems are very popular in today's communications environment. These prompting systems, such as an Interactive Voice Response (IVR) system, quickly direct a user to a particular department, extension, or information. These prompting systems may utilize advanced speech and voice recognition concepts to interpret responses. As users speak or otherwise enter their responses, advanced techniques are used to properly interpret those responses, despite differences in speech patterns, pronunciations, dialects, rhythm, and other differences. As software intelligence improves, prompting systems will continue to evolve to provide an efficient and less expensive method of resolving customer inquiries.

While prompting systems are great, prompting systems still have trouble understanding some responses. Despite improvements in voice recognition and in response interpretation, prompting systems still encounter responses that are not interpretable. Some responses, for example, are not understood or are incorrect. Whatever the causes, when a response is not interpretable, some prompting systems may ask for a repeat response. Other prompting systems may direct the user to an expensive human assistant. Still other prompting systems abruptly terminate the encounter. What is needed, however, is a prompting system that attempts to alternatively communicate with a user.

SUMMARY

The aforementioned problems, and other problems, are reduced, according to the exemplary embodiments, using methods, systems, and products that process responses to a prompting system. The prompting system may be voice-based, such as an Interactive Voice Response (IVR) system. The prompting system, however, could also prompt with electronic messages. However the prompts are presented, when a response is not interpretable, exemplary embodiments present alternative presentations of prompts. If a user's response to a prompt is not understood, exemplary embodiments reformat that same prompt. A voice prompt, for example, may be reformatted into an email message. The email message is then sent to an email address associated with the user. The email message prompts the user for the same information, but the email message may no longer elicit a spoken or audible response. When the user responds to the emailed prompt, the prompting system obtains that response without resorting to a more expensive human assistant and without terminating the prompting session. Additional exemplary embodiments describe how web pages, banners, text messages, and other alternative presentations may be used when responses are not interpretable. Exemplary embodiments thus utilize inexpensive alternatives to elicit responses.

The exemplary embodiments describe a method for processing responses in a prompting system. A response to a prompt is received. The response is compared to a set of conditions for interpreting the response. If the response is not interpretable, then a prioritized alternative presentation of the prompt is obtained. A supplemental prompt is sent that presents the alternative presentation.

In another of the embodiments, a system is disclosed for processing responses in a prompting system. A prompting application is stored in memory and a processor communicates with the memory. The processor receives a response to a prompt and compares the response to a set of conditions for interpreting the response. If the response is not interpretable, then the processor obtains a prioritized alternative presentation of the prompt. The processor then sends a supplemental prompt that presents the alternative presentation of the prompt.

In yet another embodiment, a computer program product is also disclosed for processing responses in a prompting. The computer program product comprises a computer-readable medium storing computer code. This computer code causes receipt of a response and compares the response to a set of conditions for interpreting the response. If the response is not interpretable, then a prioritized alternative presentation of the prompt is obtained. A supplemental prompt is sent that presents the alternative presentation of the prompt.

Other systems, methods, and/or computer program products according to the exemplary embodiments will be or become apparent to one with ordinary skill in the art upon review of the following drawings and detailed description. It is intended that all such additional systems, methods, and/or computer program products be included within this description, be within the scope of the claims, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

These and other features, aspects, and advantages of the exemplary embodiments are better understood when the following Detailed Description is read with reference to the accompanying drawings, wherein:

FIG. **1** is a schematic illustrating a prompting system, according to exemplary embodiments;

FIG. **2** is another schematic illustrating a system for processing responses, according to exemplary embodiments;

FIGS. **3** and **4** are more schematics illustrating the prompting system, according to more exemplary embodiments;

FIG. **5** is a schematic illustrating the prompting system utilizing CC/PP information, according to more exemplary embodiments;

FIG. **6** is a schematic illustrating another network operating environment, according to the exemplary embodiments;

FIG. **7** depicts a possible operating environment for exemplary embodiments;

FIGS. **8-13** are schematics illustrating various other communications devices for processing responses, according to the exemplary embodiments; and

FIGS. **14-17** are flowcharts illustrating methods of processing responses in a prompting system, according to more exemplary embodiments.

DETAILED DESCRIPTION

The exemplary embodiments will now be described more fully hereinafter with reference to the accompanying drawings. The exemplary embodiments may, however, be embod-

ied in many different forms and should not be construed as limited to the embodiments set forth herein. These embodiments are provided so that this disclosure will be thorough and complete and will fully convey the scope of the invention to those of ordinary skill in the art. Moreover, all statements herein reciting embodiments, as well as specific examples thereof, are intended to encompass both structural and functional equivalents thereof. Additionally, it is intended that such equivalents include both currently known equivalents as well as equivalents developed in the future (i.e., any elements developed that perform the same function, regardless of structure).

Thus, for example, it will be appreciated by those of ordinary skill in the art that the diagrams, schematics, illustrations, and the like represent conceptual views or processes illustrating the exemplary embodiments. The functions of the various elements shown in the figures may be provided through the use of dedicated hardware as well as hardware capable of executing associated software. Similarly, any switches shown in the figures are conceptual only. Their function may be carried out through the operation of program logic, through dedicated logic, through the interaction of program control and dedicated logic, or even manually, the particular technique being selectable by the entity implementing this invention. Those of ordinary skill in the art further understand that the exemplary hardware, software, processes, methods, and/or operating systems described herein are for illustrative purposes and, thus, are not intended to be limited to any particular named manufacturer.

FIG. **1** is a schematic illustrating a prompting system **20**, according to exemplary embodiments. The prompting system **20** comprises a prompting application **22** stored in memory **24** of a computer **26**. The prompting system **20** may couple to a voice generation unit **28** and to a response receiver **30**. The prompting system **20** audibly and/or visually presents a menu **32** of prompts to users. The menu **32** of prompts may be stored in the memory **24**. If the menu **32** of prompts includes voice portions, the voice generation unit **28** generates voice messages, and the response receiver **30** receives responses to those voice messages. The responses may be Dual-Tone Model Frequency (DTMF) inputs, such that the response receiver **30** receives the DTMF inputs. The responses may be vocal or audible and analyzed and interpreted by voice recognition. The responses may be electronic messages or inputs received by the prompting application **22**. Although most readers are assumed to be generally familiar with an Interactive Voice Response system, the exemplary embodiments may be applied to any type of prompting system, whether exposed by audible, voice, and/or visual prompts. Any type of prompting system, having a sequence of choices that can be exposed for searching and for entry, may utilize the exemplary embodiments. Additionally, any vendor's Interactive Voice Response application may be designed or revised to include the principles described herein. The operating principles and componentry of a typical prompting system, however, are well understood by those of ordinary skill in the art and, thus, will not be further explained here. If the reader desires a further explanation, the reader is directed to the following sources, all incorporated herein by reference: U.S. Pat. No. 4,142,067 to Williamson (Feb. 27, 1979); U.S. Pat. No. 5,553,127 to Martin et al. (Sep. 3, 1996); U.S. Pat. No. 5,872,834 to Teitelbaum (Feb. 16, 1999); U.S. Pat. No. 6,016,336 to Hanson (Jan. 18, 2000); U.S. Pat. No. 6,370,238 to Sansone et al. (Apr. 9, 2002); U.S. Pat. No. 6,456,619 to Sassin et al. (Sep. 24, 2002); U.S. Pat. No. 6,487,277 to Beyda et al. (Nov. 26, 2002); U.S. Pat. No. 6,665,644 to Kanevsky et al. (Dec. 16, 2003); U.S. Pat. No. 6,842,767 Partovi et al. (Jan. 11, 2005); U.S. Pat. No. 6,853,966 to Bushey et al. (Feb. 8, 2005); U.S. Pat. No. 6,885,733 to Pearson et al. (Apr. 26, 2005); U.S. Pat. No. 6,922,466 to Peterson et al. (Jul. 26, 2005); U.S. Pat. No. 6,944,592 to Pickering (Sep. 13, 2005); Published U.S. Patent Application 2003/0232640 to Walker et al. (Dec. 18, 2003); Published U.S. Patent Application 2004/0006476 to Chiu (Jan. 8, 2004); Published U.S. Patent Application 2004/0042592 to Knott et al. (Mar. 4, 2004); Published U.S. Patent Application 2005/0027536 to Matos et al. (Feb. 3, 2005); Published U.S. Patent Application 2005/0069122 to Lin. (Mar. 31, 2005);

The prompting system **20**, however, differs from a conventional prompting system. Here the prompting system **20**, under certain conditions, sends a supplemental prompt **34**. As users speak, send, enter, or otherwise indicate their responses to the menu **32** of prompts, each response is compared to a set **36** of conditions. The set **36** of conditions are used to interpret the responses. If one or more responses are not interpretable, then the prompting application **22** obtains an alternative presentation **38** of the prompt. As the following paragraphs will explain in greater detail, the alternative presentation **38**, for example, may be a textual, visual, or multimedia representation of a prompt. The prompting application **22** then sends the supplemental prompt **34**, and the supplemental prompt **36** presents the alternative presentation **38** of the prompt. The prompting application **22**, then, resends the prompt, but the prompt is presented in an alternative format. Suppose, for example, that the menu **32** of prompts asks the user to speak a response to a prompt. If the user speaks too softly, then the response receiver **30** may not discern the user's response. Because the user's response is not interpretable, the prompting application **22** forms the alternative presentation **38** of the prompt. The supplemental prompt **34** may thus be a visual, textual, or multimedia version of the same prompt, but the supplemental prompt **34** may elicit a non-verbal response. The supplemental prompt **34**, for example, may be an electronic message or XML page that is sent to the user. The supplemental prompt **34** may even elicit a tactile response (perhaps via a keypad or pointing device) to the prompt. The supplemental prompt **34** has a different presentation of the prompt, thus helping ensure the user's responses are adequately received and properly interpreted.

The set **36** of conditions are used to interpret the responses. The set **36** of conditions represent logical branch/tree statements for determining whether a response is understood. The set **36** of conditions, for example, could be logical "if/then/else" statements that invoke software, hardware, or control modules. Using the above example, if the user speaks too softly, then the response receiver **30** may not discern the user's response. The set **36** of conditions, then, may call an email module to send a supplemental prompting email to the user. The set **36** of conditions may additionally or alternatively call an eXtensible Markup Language (XML) module to send an XML web page to the user. If a supplemental prompt still receives an non-interpretable response, or no response, then the set **36** of conditions may invoke an exception module that presents a final prompt (e.g., "we are unable to understand your response, please call back"). The set **36** of conditions may include various statements for interpreting responses, including speech/vocal recognition techniques and electronic messaging and communication parameters. The set **36** of conditions, then, may be populated with known statements for recognizing and processing audible, spoken, tonal, and electronic responses to the menu **32** of prompts. A complete description of the set **36** of conditions, however, is beyond the scope of this disclosure. Moreover, because such

techniques are known to those of ordinary skill in the art, the set **36** of conditions need not be further explained.

In the figures described below, as in FIG. **1**, reference numeral **20** refers to a prompting system and reference numeral **22** refers to a prompting application. The reader, however, will appreciate that the prompting system **20** and the prompting application **22** need not include all the elements and capabilities described. Rather, the prompting system **20** and the prompting application **22**, according to exemplary embodiments, may include one or any combination of elements and capabilities for supplementing prompts.

FIG. **2** is another schematic illustrating a system for processing responses, according to exemplary embodiments. The prompting application **22** (stored in the memory **24** of the computer **26**) causes a processor **40** to receive a communication **42** from the user's communications device **44**. The communication **42** may include a communications address **46** (or other identifying information) of the user's communications device **44**. The communication **42** may also include a response **48** to the menu **32** of prompts. The prompting application **22** compares the response **48** to the set **36** of conditions for interpreting the response. If the response **48** is not interpretable, then the prompting application **22** accesses a database **50** of profiles. The database **50** of profiles stores a profile **52** associated with the communications address **46** of the communications device **44**. The profile **52** stores a list **54** of alternative presentations for prompts. The list **54** of alternative presentations represents alternative formats for supplemental prompts. The list **54** of alternative presentations, for example, may include an instant or email message **56**, a text message **58**, a web page **60**, a video **62**, a voice message **64**, an electronic banner message **66**, a multimedia communication **68**, a page message **70**, and a telephone or Voice over Internet Protocol (VoIP) **72**. FIG. **2**, however, is not intended to be an exhaustive listing of alternative presentations. The list **54** of alternative presentations may include any vocal/audible presentation, tonal presentation (e.g., DTMF), textual presentation, and or visual presentation of a prompt, using any form of communication. The list **54** of alternative presentations may be prioritized, such that the prompting application **22** sequentially attempts each entry. However the list **54** of alternative presentations is configured, the prompting application **22** causes the processor **40** to obtain the alternative presentation **38** of the prompt. The prompting application **22** causes the processor **40** to send the supplemental prompt **34** to the communications device **44**, and the supplemental prompt **34** presents the alternative presentation **38** of the prompt.

FIG. **3** is another schematic illustrating the prompting system **20**, according to more exemplary embodiments. Here the prompting application **22** causes the processor **40** to access a list **74** of communications addresses. When the computer **26** receives the response **48**, the prompting application **22** again compares the response **48** to the set **36** of conditions. If the response **48** is not interpretable, then the prompting application **22** again accesses the list of alternative presentations (shown as reference numeral **54** in FIG. **2**) and obtains the alternative presentation **38** of the prompt. Yet here the prompting application **22** also retrieves a communications address **76** from the list **74** of communications addresses. The list **74** of communications addresses stores alternative addresses to which the supplemental prompt **34** may be sent. That is, when the supplemental prompt **34** is formatted as the alternative presentation **38**, the supplemental prompt **34** may be sent to the user's communications device **44**. The prompting application **22**, however, may additionally or alternatively send the supplemental prompt **34** to any communications address in the list **74** of communications addresses. The list **74** of communications addresses may be populated with alternative destinations and/or devices which may receive the supplemental prompt **34**. The user, for example, may want the supplemental prompt **34** sent to the user's cell phone, home computer, web-enabled or digital television, set-top box, or any other communications device. The user may even specify alterative destinations, such as work computer, work phone, home phone, friend or family member device/destination, or any other destination. Each communications address **76** in the list **74** of communications addresses may be any communications address, such as a telephone number, pager number, Internet Protocol address, physical address, or any other communications address. The list **74** of communications addresses may be prioritized, such that the prompting application **22** sequentially attempts each entry. However the list **74** of communications addresses is configured, the prompting application **22** causes the processor **40** to obtain the communications address **76** and to send the supplemental prompt **34** to the communications address **76**. The supplemental prompt **34** presents the alternative presentation **38** of the prompt.

FIG. **4** is yet another schematic illustrating the prompting system **20**, according to still more exemplary embodiments. Here the user configures his or her profile **52** with a prioritized list of supplemental prompts. The user prioritizes the alternative presentation **38** that is sent to the communications address **46**. The user's profile **52** may include a table **78**. The table **78** maps an alternative presentation **38** to its associated communications address **46**. As FIG. **4** illustrates, for example, the user may associate the alternative email presentation **56** to the user's email address **80**. The table **78** also associates the alternative text message presentation **58** to a cell phone text message address **82**. The user may continue populating the table **78** with other alternative presentations **38** and their associated destination addresses.

The prompting application **22** then operates as before. When the computer **26** receives the response **48**, the prompting application **22** compares the response **48** to the set **36** of conditions. If the response **48** is not interpretable, then the prompting application **22** accesses the database **50** of profiles. The database **50** of profiles stores the profile **52** associated with the communications address **46** of the user's communications device **44**. The profile **52** maintains the table **78** that associates alternative presentations with communications addresses. The prompting application **22** causes the processor **40** to sequentially or randomly obtain an alternative presentation **38** and its associated communications address **46**. The processor **40** then sends the supplemental prompt **34** to the communications address **46**, and the supplemental prompt **34** presents the alternative presentation **38** of the prompt.

FIG. **5** is a schematic illustrating the prompting system **20**, according to more exemplary embodiments. Here the prompting application **22** uses Composite Capabilities/Preference Profiles (CC/PP) information **84** to form the supplemental response **48**. The prompting application **22** selects and/or formats the supplemental response **48** according to the CC/PP information **84**. As those of ordinary skill in the art understand, CC/PP information provides a structure and a vocabulary for describing a communications device's hardware capabilities, software capabilities, and user preferences. Because Composite Capability/Preference Profile information is already known, this specification will not provide a detailed explanation of such information. If, however, the reader desires a detailed explanation, the reader is invited to consult W3C, *Composite Capability/Preference Profiles (CC/PP): Structure and Vocabularies*, available from the World Wide Web Consortium (W3C), 32 Vassar Street, Room

32-G515, Cambridge, Mass. 02139 USA and from the European Office of the World Wide Web Consortium (W3C), 2004, route des Lucioles, BP 93, 06902 Sophia-Antipolis Cedex France, and incorporated herein by reference in its entirety.

FIG. **5** illustrates the CC/PP information **84**. The prompting application **22** again receives the communication **42** from the user's communications device **44**. The user's communications device **44** is shown as a mobile phone **86**, but the communications device **44**, as later paragraphs will explain, may be any other device. The communication **42** may include the communications address **46** (or other identifying information) of the user's communications device **44** and the response **48** to the menu **32** of prompts. Here the communication **42** also includes the CC/PP information **84**. The CC/PP information **84** may be contained within any portion of the communication **42**, but the CC/PP information **84** is typically contained within a header portion **88**. When the computer **26** receives the response **48**, as before, the prompting application **22** compares the response **48** to the set **36** of conditions. If the response **48** is not interpretable, then the prompting application **22** prepares the supplemental prompt **34**. Here, however, the prompting application **22** may use the CC/PP information **84** to determine the communications device's hardware capabilities, software capabilities, and user preferences.

The prompting application **22**, for example, may select an alternative presentation based on the CC/PP information **84**. When the prompting application **22** accesses the list **54** of alternative presentations, the prompting application **22** may select an alternative presentation that is compatible with the user's communications device **44**. If, for example, the CC/PP information **84** indicates that the user's mobile phone **86** does not have video capabilities, then the prompting application **22** may decline to select the alternative video presentation **62** (and perhaps the alternative multimedia presentation **68**). If the CC/PP information **84** indicates that the user's mobile phone **86** does not have a color display, then the prompting application **22** may select a black and white or grayscale alternative. If the CC/PP information **84** indicates that the user's mobile phone **86** has a slow bandwidth connection, a slower processor, or low memory, then the prompting application **22** may select a less bandwidth intensive alternative presentation. Whatever the CC/PP information **84** indicates, the prompting application **22** may select an alternative presentation based on the CC/PP information **84**. The processor **40** then sends the supplemental prompt **34** as before.

The prompting application **22** may format the supplemental response **48** according to the CC/PP information **84**. Whether or not the CC/PP information **84** is used to select the alternative presentation, the prompting application **22** may format the supplemental response **48** according to the CC/PP information **84**. Suppose the CC/PP information **84** indicates that the user's communications device **44** (e.g., the mobile phone **86**) has a color display with a 120×120 resolution. The prompting application **22**, then, may format the supplement response **48** to best suit this display. If the CC/PP information **84** indicates that the user's communications device **44** has calendar capabilities, then the prompting application **22** may format the supplement response **48** as a task or reminder to further prompt the user. If the CC/PP information **84** indicates that the user's mobile phone **86** is connected to a car kit, then the prompting application **22** may format the supplement response **48** with louder audible/spoken portions to overcome background or road noise. Again, whatever the CC/PP information **84** indicates, the prompting application **22** may format the supplement response **48** based on the CC/PP information **84**. The processor **40** then sends the supplemental prompt **34** as before.

The user may configure his or her profile **52** with emergency contacts. For example, the user may configure the profile **52** to include emergency contact information to be used if the user's responses cannot be interpreted, once all the alternative presentations and the alternative communications addresses have been attempted. As the above paragraphs explained, the set **36** of conditions include an exception when all other conditions have failed (e.g., "we are unable to understand your response, please call back"). Here, however, the exception condition may cause prompts to be sent to friends, relatives, or even emergency personnel. If an elderly person, for example, fails to response to all the alternative presentations, that elderly person may want their son or daughter to be immediately notified. Parents may establish exception/emergency contacts for their children. Businesses may establish exception/emergency contacts for other personnel. Whatever the situation, the user's profile **52** may include exception/emergency contacts.

FIG. **6** is a schematic illustrating another network operating environment, according to the exemplary embodiments. Here the prompting application **22** operates within a network environment. That is, the prompting application **22** is remotely located from the database **50** of profiles. When the prompting application **22** queries the database **50** of profiles, queries are sent via a communications network **90**. The database **50** of profiles then sends a response via the communications network **90**. Networking environments, however, are well known and need not be further discussed. FIG. **6** simply illustrates that exemplary embodiments may operate in any networking environment.

The exemplary embodiments may be applied regardless of networking environment. The communications network **90** may be a cable network operating in the radio-frequency domain and/or the Internet Protocol (IP) domain. The communications network **90** may have POTS components and/or features. The communications network **90**, however, may also include a distributed computing network, such as the Internet (sometimes alternatively known as the "World Wide Web"), an intranet, a local-area network (LAN), and/or a wide-area network (WAN). The communications network **90** may include coaxial cables, copper wires, fiber optic lines, and/or hybrid-coaxial lines. The communications network **90** may even include wireless portions utilizing any portion of the electromagnetic spectrum and any signaling standard (such as the I.E.E.E. 802 family of standards, GSM/CDMA/TDMA or any cellular standard, and/or the ISM band). The concepts described herein may be applied to any wireless/wireline communications network, regardless of physical componentry, physical configuration, or communications standard(s).

FIG. **7** depicts a possible operating environment for exemplary embodiments. FIG. **7** is a block diagram showing the prompting application **22** residing in a processor-controlled system **150** (such as the computer **26** shown in FIGS. **1-6**). FIG. **7**, however, may also represent a block diagram of any computer or communications device in which the prompting application **22** may operate. The prompting application **22** operates within a system memory device. The prompting application **22**, for example, is shown residing in a memory subsystem **152**. The prompting application **22**, however, could also reside in flash memory **154** or peripheral storage device **156**. The computer system **150** also has one or more central processors **158** executing an operating system. The operating system, as is well known, has a set of instructions

that control the internal functions of the computer system **150**. A system bus **160** communicates signals, such as data signals, control signals, and address signals, between the central processor **158** and a system controller **162**. The system controller **162** provides a bridging function between the one or more central processors **158**, a graphics subsystem **164**, the memory subsystem **152**, and a PCI (Peripheral Controller Interface) bus **166**. The PCI bus **166** is controlled by a Peripheral Bus Controller **168**. The Peripheral Bus Controller **168** is an integrated circuit that serves as an input/output hub for various peripheral ports. These peripheral ports could include, for example, a keyboard port **170**, a mouse port **172**, a serial port **174**, and/or a parallel port **176** for a video display unit, one or more external device ports **178**, and external hard drive ports **180** (such as IDE, ATA, SATA, or SCSI). The Peripheral Bus Controller **168** could also include an audio subsystem **182**. Those of ordinary skill in the art understand that the program, processes, methods, and systems described herein are not limited to any particular computer system or computer hardware.

One example of the central processor **158** is a microprocessor. Advanced Micro Devices, Inc., for example, manufactures a full line of ATHLON™ microprocessors (ATHLON™ is a trademark of Advanced Micro Devices, Inc., One AMD Place, P.O. Box 3453, Sunnyvale, Calif. 94088-3453, 408.732.2400, 800.538.8450, www.amd.com). The Intel Corporation also manufactures a family of X86 and P86 microprocessors (Intel Corporation, 2200 Mission College Blvd., Santa Clara, Calif. 95052-8119, 408.765.8080, www.intel.com). Other manufacturers also offer microprocessors. Such other manufacturers include Motorola, Inc. (1303 East Algonquin Road, P.O. Box A3309 Schaumburg, Ill. 60196, www.Motorola.com), International Business Machines Corp. (New Orchard Road, Armonk, N.Y. 10504, (914) 499-1900, www.ibm.com), and Transmeta Corp. (3940 Freedom Circle, Santa Clara, Calif. 95054, www.transmeta-.com). Those skilled in the art further understand that the program, processes, methods, and systems described herein are not limited to any particular manufacturer's central processor.

According to an exemplary embodiment, any of the WINDOWS® (WINDOWS® is a registered trademark of Microsoft Corporation, One Microsoft Way, Redmond Wash. 98052-6399, 425.882.8080, www.Microsoft.com) operating systems may be used. Other operating systems, however, are also suitable. Such other operating systems would include the UNIX® operating system (UNIX® is a registered trademark of the Open Source Group, www.opensource.org), the UNIX-based Linux operating system, WINDOWS NT®, and Mac® OS (Mac® is a registered trademark of Apple Computer, Inc., 1 Infinite Loop, Cupertino, Calif. 95014, 408.996.1010, www.apple.com). Those of ordinary skill in the art again understand that the program, processes, methods, and systems described herein are not limited to any particular operating system.

The system memory device (shown as memory subsystem **152**, flash memory **154**, or peripheral storage device **156**) may also contain an application program. The application program cooperates with the operating system and with a video display unit (via the serial port **174** and/or the parallel port **176**) to provide a Graphical User Interface (GUI). The Graphical User Interface typically includes a combination of signals communicated along the keyboard port **170** and the mouse port **172**. The Graphical User Interface provides a convenient visual and/or audible interface with a subscriber of the computer system **150**.

FIG. **8** is a schematic illustrating still more exemplary embodiments. FIG. **8** illustrates that the prompting application **22** may alternatively or additionally operate within various other communications devices. FIG. **8**, for example, illustrates that the prompting application **22** may entirely or partially operate within a personal digital assistant (PDA) **200**, a Global Positioning System (GPS) device **202**, an interactive television **204**, an Internet Protocol (IP) phone **206**, a pager **208**, a set-top-box (STB) **210**, a cellular/satellite phone **212**, or any computer system and/or communications device utilizing a digital signal processor (DSP) **214**. The communications device may also include watches, radios, vehicle electronics, clocks, printers, gateways, and other apparatuses and systems.

FIGS. **9-11** are schematics further illustrating various other communications devices for processing responses, according to the exemplary embodiments. FIG. **9** is a block diagram of a Subscriber Identity Module **220**, while FIGS. **10** and **11** illustrate, respectively, the Subscriber Identity Module **220** embodied in a plug **222** and the Subscriber Identity Module **220** embodied in a card **224**. As those of ordinary skill in the art recognize, the Subscriber Identity Module **220** may be used in conjunction with many communications devices (such as those shown in FIG. **8**). The Subscriber Identity Module **220** stores subscriber information (such as the subscriber's International Mobile Subscriber Identity, the subscriber's K_i number, and other subscriber information), perhaps the subscriber's profile (shown as reference numeral **108**), and any portion of the prompting application **22**. As those of ordinary skill in the art also recognize, the plug **222** and the card **224** each interface with the communications device according to GSM Standards 2.17 and 11.11 and ISO Standard 7816, with each incorporated herein by reference. The GSM Standard 2.17 is formally known as "European digital cellular telecommunications system (Phase 1); *Subscriber Identity Modules, Functional Characteristics* (GSM 02.17 V3.2.0 (1995-01))." The GSM Standard 11.11 is formally known as "Digital cellular telecommunications system (Phase 2+) (GSM); *Specification of the Subscriber Identity Module—Mobile Equipment* (*Subscriber Identity Module—ME*) *interface* (GSM 11.11 V5.3.0 (1996-07))." Both GSM standards are available from the European Telecommunication Standards Institute (650 route des Lucioles, 06921 Sophia-Antipolis Cedex, FRANCE, Tel.:+33 (0)4 92 94 42 00, Fax:+33 (0)4 93 65 47 16, www.etsi.org). The ISO Standard 7816 is formally known as "*Information technology—Identification cards—Integrated circuit*(*s*) *cards with contacts,*" and the standard is available from the International Organization for Standardization (ISO) (1, rue de Varembé, Case, postale 56CH-1211 Geneva 20, Switzerland, Telephone+41 22 749 01 11, Telefax+41 22 733 34 30, www.iso.org).

FIG. **9** is a block diagram of the Subscriber Identity Module **220**, whether embodied as the plug **222** of FIG. **10** or as the card **224** of FIG. **11**. Here the Subscriber Identity Module **220** comprises a microprocessor **226** (μP) communicating with memory modules **228** via a data bus **230**. The memory modules may include Read Only Memory (ROM) **232**, Random Access Memory (RAM) and or flash memory **234**, and Electrically Erasable-Programmable Read Only Memory (EEPROM) **236**. The Subscriber Identity Module **220** stores some or all of the prompting application **22** in one or more of the memory modules **228**. FIG. **9** shows the prompting application **22** residing in the Erasable-Programmable Read Only Memory **236**, yet the prompting application **22** could alternatively or additionally reside in the Read Only Memory **232** and/or the Random Access/Flash Memory **234**. An Input/

Output module **238** handles communication between the Subscriber Identity Module **220** and the communications device. As those skilled in the art will appreciate, there are many suitable ways for implementing the operation and physical/memory structure of the Subscriber Identity Module. If, however, the reader desires more information on the Subscriber Identity Module, the reader is directed to the following sources: LAWRENCE HARTE et al., GSM SUPERPHONES 99-100, 113-14 (1999); SIEGMUND REDL et al., GSM AND PERSONAL COMMUNICATIONS HANDBOOK 303-69 (1998); and JOACHIM TISAL, GSM CELLULAR RADIO TELEPHONY 99-130 (1997), with each incorporated herein by reference.

FIG. **12** is a schematic further illustrating various communications devices for processing responses, according to the exemplary embodiments. FIG. **12** is a block diagram of another communications device **250** utilizing any portion of the prompting application **22**. In one embodiment, the communications device **250** comprises a radio transceiver unit **252**, an antenna **254**, a digital baseband chipset **256**, and a man/machine interface (MMI) **258**. The transceiver unit **252** includes transmitter circuitry **260** and receiver circuitry **262** for receiving and transmitting radio-frequency (RF) signals. The transceiver unit **252** couples to the antenna **254** for converting electrical current to and from electromagnetic waves. The digital baseband chipset **256** contains a digital signal processor (DSP) **264** and performs signal processing functions for audio (voice) signals and RF signals. As FIG. **12** shows, the digital baseband chipset **256** may also include an on-board microprocessor **266** that interacts with the man/machine interface (MMI) **258**. The man/machine interface (MMI) **258** may comprise a display device **268**, a keypad **270**, and the Subscriber Identity Module **220**. The on-board microprocessor **266** performs GSM protocol functions and control functions for the radio circuitry **260** and **262**, for the display device **268**, and for the keypad **270**. The on-board microprocessor **266** may also interface with the Subscriber Identity Module **220** and with the prompting application **22** residing in the memory module **228** of the Subscriber Identity Module **220**. Those of ordinary skill in the art will appreciate that there may be many suitable architectural configurations for the elements of the communications device **250**. If the reader desires a more detailed explanation, the reader is invited to consult the following sources: LAWRENCE HARTE et al., GSM SUPERPHONES 105-120 (1999); SIEGMUND REDL et al., GSM AND PERSONAL COMMUNICATIONS HANDBOOK 389-474 (1998); and JOACHIM TISAL, GSM CELLULAR RADIO TELEPHONY 99-130 (1997), with each incorporated herein by reference.

The prompting application **22** may be utilized regardless of signaling standard. As those of ordinary skill in the art recognize, FIGS. **9-12** illustrate a Global System for Mobile (GSM) communications device. That is, the communications device utilizes the Global System for Mobile (GSM) communications signaling standard. Those of ordinary skill in the art, however, also recognize the prompting application **22** is equally applicable to any communications device utilizing the Time Division Multiple Access signaling standard, the Code Division Multiple Access signaling standard, the "dual-mode" GSM-ANSI Interoperability Team (GAIT) signaling standard, or any variant of the GSM/CDMA/TDMA signaling standard.

FIG. **13** is a block diagram illustrating another communications device in which the prompting application **22** may operate, according to yet more of the exemplary embodiments. Here the communications device is shown as a digital high definition television (HDTV) system **300**. Although an HDTV system is shown, the exemplary embodiments are applicable to any television design. The concepts, for example, are applicable to analog circuitry, digital circuitry, analog signals, and/or or digital signals. The television may include an encoder/decoder, such as an embedded set-top box. The term "television," however, may encompass a stand-alone set-top box that is a separate component from the television. The television may also utilize any display device technology, such as a cathode-ray, a liquid crystal, a diode, digital micromirror, light processor, or plasma. The prompting application **22** may be stored in any memory location or device in the television **300**. FIG. **13**, though, is only a simplified block diagram. The operating and engineering principles are already known in the art and will not be repeated here. If, however, the reader desires more information on the television, the reader is directed to the following sources: MICHEAL ROBIN & MICHEL POULIN, DIGITAL TELEVISION FUNDAMENTALS (2000); JERRY WHITAKER AND BLAIR BENSON, VIDEO AND TELEVISION ENGINEERING (2003); JERRY WHITAKER, DTV HANDBOOK (2001); JERRY WHITAKER, DTV: THE REVOLUTION IN ELECTRONIC IMAGING (1998); and EDWARD M. SCHWALB, ITV HANDBOOK: TECHNOLOGIES AND STANDARDS (2004), with each incorporated herein by reference.

FIG. **14** is a flowchart illustrating a method of processing responses in a prompting system, according to more exemplary embodiments. A prompt is sent (Block **400**) and a response is received (Block **402**). The response may include a communications address and CC/PP information. The response is compared to a set of conditions for interpreting the response (Block **404**). If the response is determined to be interpretable (Block **406**), then a next prompt is prepared (Block **408**) and sent (Block **400**). If, however, the response is not determined to be interpretable (Block **406**), then a profile associated with the communications address is accessed (Block **410**). An alternative presentation of the prompt may be selected, perhaps based on the CC/PP information (Block **412**). A communication address may also be selected, perhaps based on the CC/PP information (Block **414**). A supplemental prompt may be formatted, based on the alternative presentation and according to the CC/PP information (Block **416**). The supplemental response is then sent that presents the alternative presentation of the prompt (Block **418**).

FIG. **15** is another flowchart illustrating a method of processing responses in a prompting system, according to more exemplary embodiments. Here a prompt is sent (Block **420**) and a spoken response is received (Block **422**). The response is compared to a set of conditions for interpreting the response (Block **424**). If the response is determined to be interpretable (Block **426**), then a next prompt is prepared (Block **428**) and sent (Block **420**). If, however, the response is not determined to be interpretable (Block **426**), then an alternative visual (Block **430**) and/or textual (Block **432**) presentation is selected. A supplemental prompt is then sent (Block **434**), and the supplemental prompt presents the visual and/or textual presentation.

FIG. **16** is another flowchart illustrating a method of processing responses in a prompting system, according to yet more exemplary embodiments. Here a prompt is sent (Block **436**) and a tonal response is received (Block **438**). The response is compared to a set of conditions for interpreting the response (Block **440**). If the response is determined to be interpretable (Block **442**), then a next prompt is prepared (Block **444**) and sent (Block **436**). If, however, the response is not determined to be interpretable (Block **442**), then an alternative visual (Block **446**) and/or textual (Block **448**) presen-

tation is selected. A supplemental prompt is then sent (Block **450**), and the supplemental prompt presents the visual and/or textual presentation.

FIG. **17** is another flowchart illustrating a method of processing responses in a prompting system, according to still more exemplary embodiments. Here a prompt is sent (Block **452**) and a textual or text-based response is received (Block **454**). The response is compared to a set of conditions for interpreting the response (Block **456**). If the response is determined to be interpretable (Block **458**), then a next prompt is obtained (Block **460**) and sent (Block **452**). If, however, the response is not determined to be interpretable (Block **458**), then an alternative visual (Block **462**), audible (Block **464**), and/or textual (Block **466**) presentation is selected. A supplemental prompt is then sent (Block **468**), and the supplemental prompt presents the visual, audible, and/or textual presentation.

The prompting application (shown as reference numeral **22** in the FIGS. **1-5** and **10-17**) may be physically embodied on or in a computer-readable medium. This computer-readable medium may include CD-ROM, DVD, tape, cassette, floppy disk, memory card, and large-capacity disk (such as IOMEGA®, ZIP®, JAZZ®, and other large-capacity memory products (IOMEGA®, ZIP®, and JAZZ® are registered trademarks of Iomega Corporation, 1821 W. Iomega Way, Roy, Utah 84067, 801.332.1000, www.iomega.com). This computer-readable medium, or media, could be distributed to end-subscribers, licensees, and assignees. These types of computer-readable media, and other types not mention here but considered within the scope of the exemplary embodiments, allow the prompting application to be easily disseminated. A computer program product comprises the prompting application stored on the computer-readable medium. The prompting application comprises computer-readable instructions/code for processing responses.

The prompting application may be physically embodied on or in any addressable (e.g., HTTP, I.E.E.E. 802.11, Wireless Application Protocol (WAP)) wireless device capable of presenting an IP address. Examples could include a computer, a wireless personal digital assistant (PDA), an Internet Protocol mobile phone, or a wireless pager.

While the exemplary embodiments have been described with respect to various features, aspects, and embodiments, those skilled and unskilled in the art will recognize the exemplary embodiments are not so limited. Other variations, modifications, and alternative embodiments may be made without departing from the spirit and scope of the exemplary embodiments.

What is claimed is:

1. A method for processing responses in a prompting system, comprising:

receiving a response from a communications address to a prompt;

comparing the response to a set of conditions for interpreting the response;

accessing a database of profiles when the response is uninterpretable;

retrieving a profile associated with the communications address;

accessing a table stored in memory that associates alternative presentations to alternative communications addresses;

retrieving an alternative communications address from the table that is associated with an alternative presentation;

reformatting the prompt into the alternative presentation retrieved from the table; and

sending a supplemental prompt to the alternative communications address that presents the alternative presentation of the prompt.

2. The method according to claim **1**, wherein receiving the response comprises receiving a spoken response, and wherein sending the supplemental prompt comprises sending at least one of a visual prompt and a textual prompt.

3. The method according to claim **1**, wherein receiving the response comprises receiving a tonal response, and wherein sending the supplemental prompt comprises sending at least one of a visual prompt and a textual prompt.

4. The method according to claim **1**, further comprising sending a text message as the supplemental prompt.

5. The method according to claim **1**, further comprising accessing Composite Capabilities/Preference Profiles (CC/PP) information associated with the alternative communications address.

6. The method according to claim **5**, further comprising forming the supplemental response into the alternative presentation according to the Capabilities/Preference Profiles (CC/PP) information.

7. A system, comprising:

a processor executing code stored in memory that causes the processor to:

receive a spoken response from a communications address to a prompt;

compare the spoken response to a set of conditions for interpreting the spoken response;

access a database of profiles when the spoken response is uninterpretable;

retrieve a profile associated with the communications address;

access a table that associates alternative presentations to alternative communications addresses;

retrieve an alternative communications address from the table that is associated with an alternative textual presentation;

reformat the prompt into a text message according to the alternative textual presentation; and

send the text message to the alternative communications address as a supplemental prompt.

8. The system according to claim **7**, wherein the code further causes the processor to receive a response to the text message.

9. The system according to claim **7**, wherein the code further causes the processor to sequentially send supplemental prompts to each alternative communications address in the table.

10. The system according to claim **7**, wherein the code further causes the processor to randomly send supplemental prompts to the alternative communications addresses in the table.

11. The system according to claim **7**, wherein the code further causes the processor to retrieve Composite Capabilities/Preference Profiles (CC/PP) information from the profile.

12. The system according to claim **11**, wherein the code further causes the processor to form the supplemental response into the alternative presentation according to the Capabilities/Preference Profiles (CC/PP) information.

13. A computer readable medium storing computer code for performing a method, the method comprising:

receiving a response from a communications address to a prompt;

comparing the response to a set of conditions for interpreting the response;

accessing a database of profiles when the response is uninterpretable;

retrieving a profile associated with the communications address;

accessing a table that associates alternative presentations to alternative communications addresses;

selecting a prioritized alternative presentation from the table;

retrieving an alternative communications address from the table that is associated with the prioritized alternative presentation;

reformatting the prompt into the prioritized alternative presentation; and

sending a supplemental prompt to the alternative communications address that presents the prioritized alternative presentation of the prompt.

14. The computer readable medium according to claim **13**, further comprising computer code for receiving a spoken response, and further comprising computer code for sending the supplemental prompt comprising at least one of a visual prompt and a textual prompt.

15. The computer readable medium according to claim **13**, further comprising computer code for receiving a tonal response, and further comprising computer code for sending the supplemental prompt comprising at least one of a visual prompt and a textual prompt.

16. The computer readable medium according to claim **13**, further comprising computer code for receiving a spoken response and for sending a text message as the supplemental prompt.

17. The computer readable medium according to claim **13**, further comprising computer code for i) retrieving Composite Capabilities/Preference Profiles (CC/PP) information from the profile and for ii) forming the supplemental response into the alternative presentation according to the Capabilities/Preference Profiles (CC/PP) information.

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